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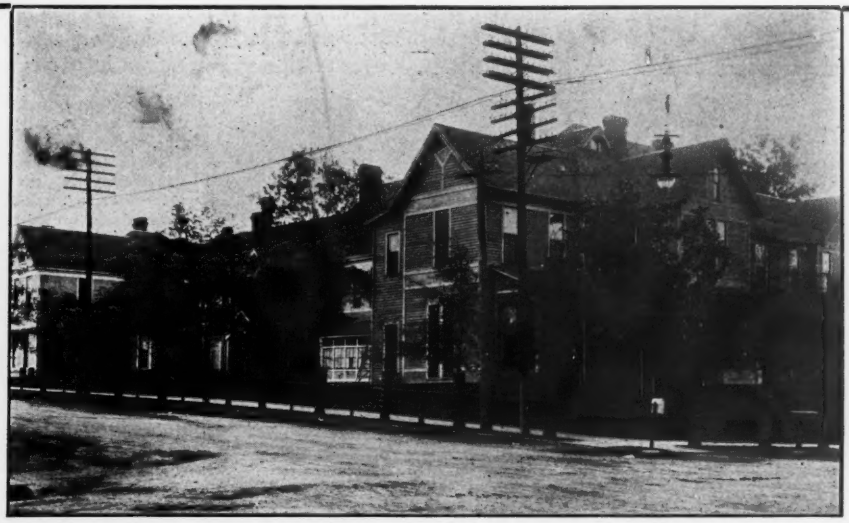

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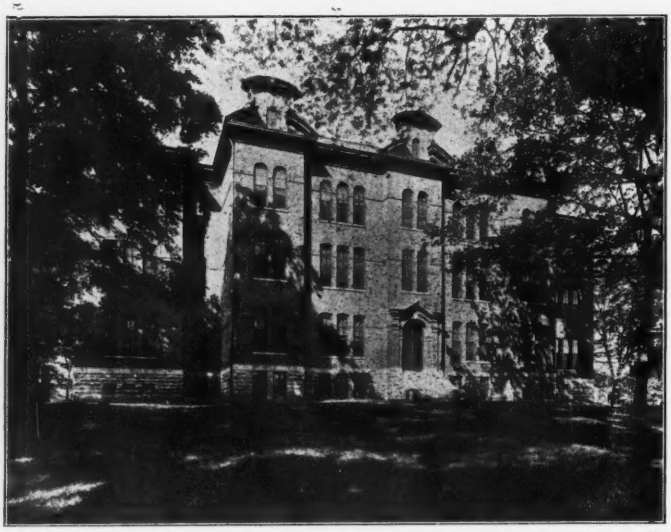

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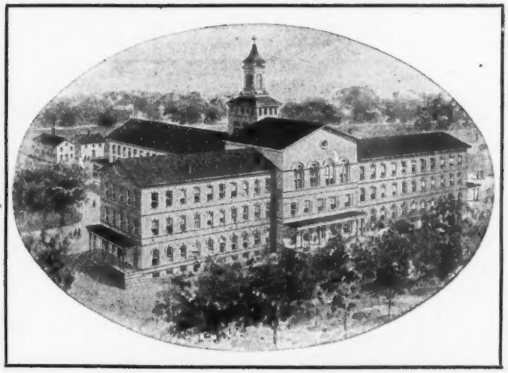

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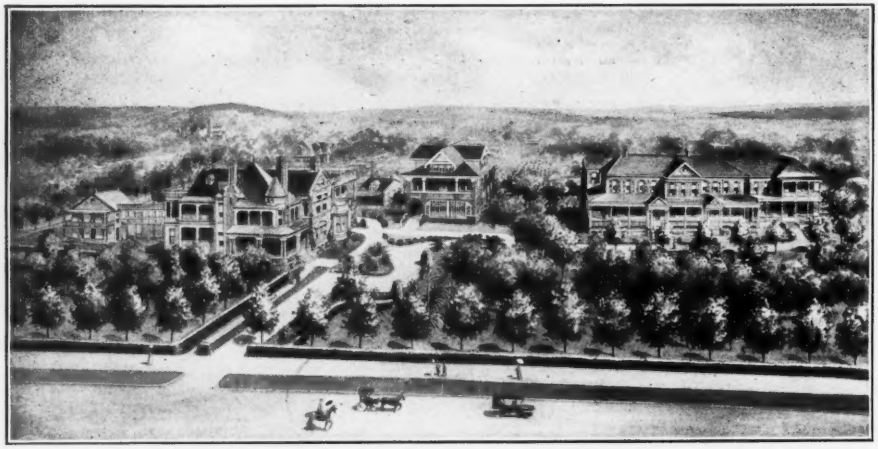

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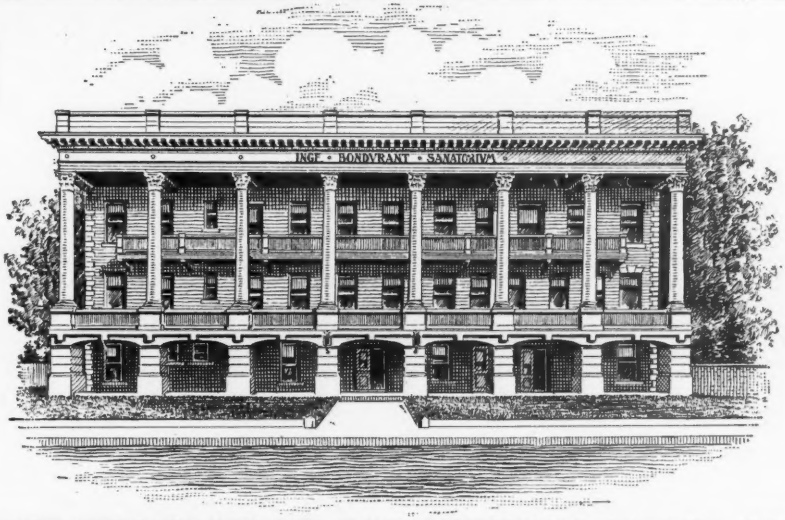

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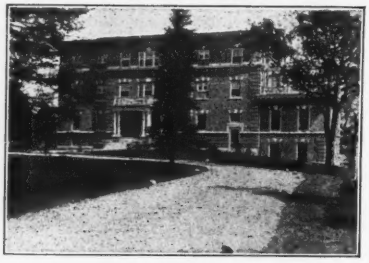

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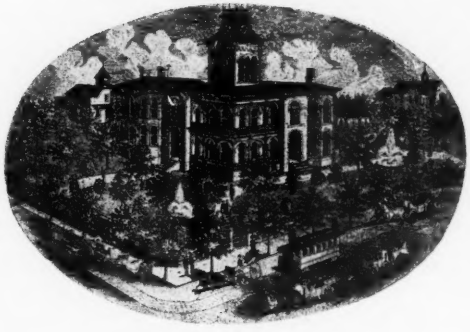

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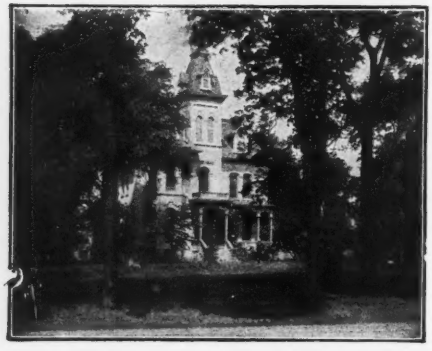

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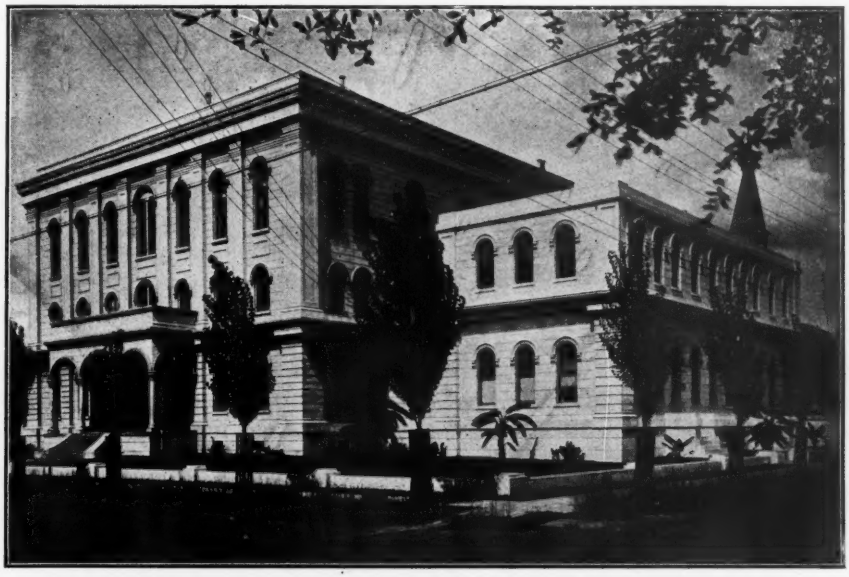

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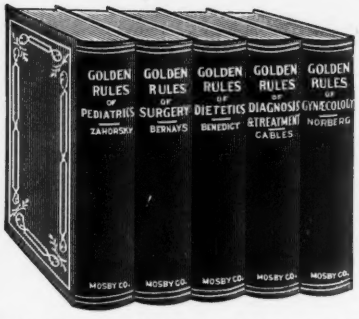
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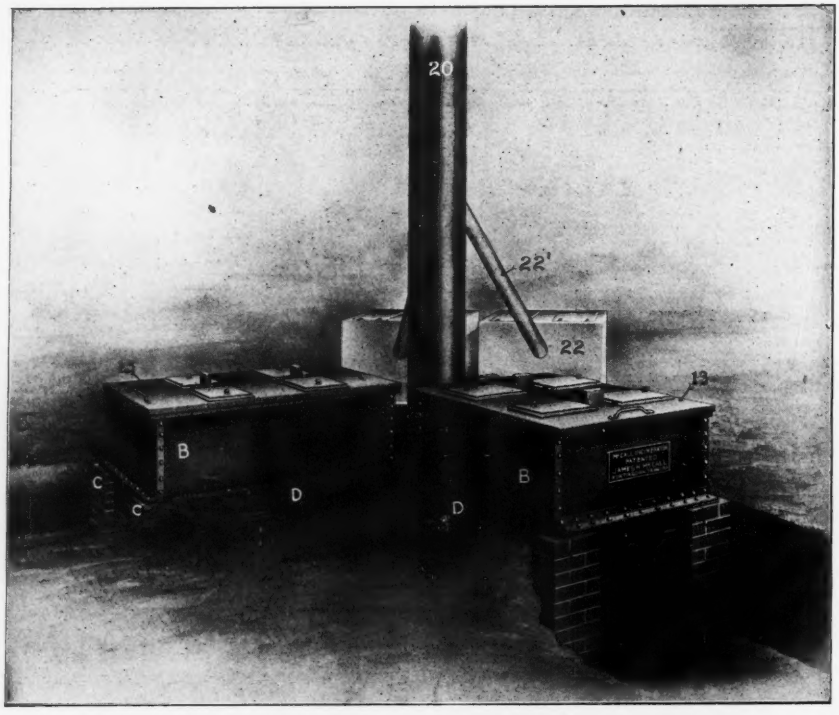

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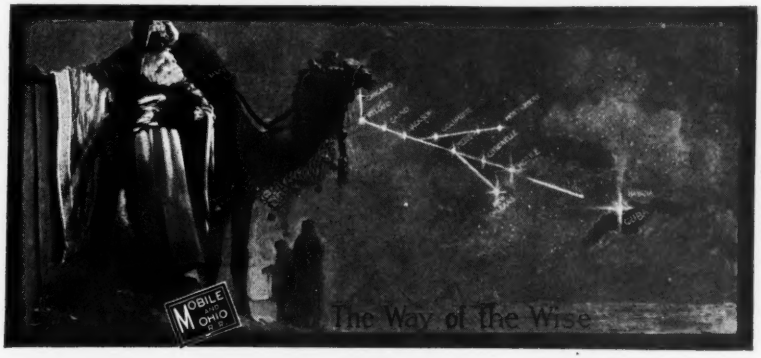

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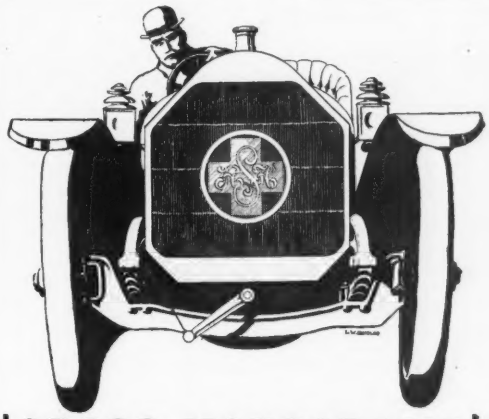

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ORIGINAL ARTICLES

PRESIDENT'S ADDRESS, DELIVERED AT THE EIGHTH ANNUAL MEETING OF THE AMERICAN SOCIETY OF TROPICAL MEDICINE, NEW ORLEANS, MAY 18 AND 19, 1911

By DR. WILLIAM SYDNEY THAYER,
Baltimore, Md.

With the territorial expansion brought upon our country by the events of 1898, the necessity for a more general knowledge of those diseases which prevail in tropical climates became evident, and with the necessity for such knowledge came greatly increased opportunities for study and the obligation that those opportunities should not be neglected. What has been done by American students since this time is known to all.

The noble work of Reed, Lazear, Carroll, Agramonte and Leonard Wood—I say Leonard Wood, because it was his wisdom and generosity that rendered this work possible—the extraordinary results accomplished by Gorgas, in the prophylaxis against yellow fever, malaria and plague at Havana and in the Canal Zone; the successful prophylaxis against the spread of cholera, plague and beriberi in the Philippines—these are accomplishments to which we point with just pride.

With a recognition of the work which was to be done, and of the advantages to be gained by bringing together students in this especial field of medicine, and by encouraging the study of tropical disease at home and abroad, a small group of men in Philadelphia, seven years ago, conceived the idea of founding a Society of Tropical Medicine.

The object of this society, as set forth in the constitution, was "to advance the knowledge of tropical diseases by encouraging original research by its members and others; collecting and recording facts ascertained by such researches, and disseminating information thereof by discussion among its members, and by the publication of papers read before the society."

This society was conceived at first as a purely local organization, but the founders soon realized that its functions were properly national, and so it has become a truly national body.

In the eight years past there have been held seven meetings at which papers of interest and value have been read and many excellent discussions have been held. The society might, however, take a more active part in the discussion of matters of immediate public importance, and should occupy a more prominent position among the special medical societies of this country. It should, for instance, be one of the constituents of the Congress of American Physicians and Surgeons. This should and does bring before us the question of what the proper functions of this organization should be; as to whether there may not be public or other duties which we might fulfil to the more general advantage of all; as to whether our constitution and conditions of membership are such as best to further those interests for the benefit of which this society was founded.

The first function of such a society as this should be, it would seem, to gather together at its meetings those men who are doing active

work in the study of the pathology, prophylaxis and therapy of those diseases which occur, or may occur, in our tropical possessions, and in the southern part of our country, and are, or may become a menace to the health of our people abroad and at home.

In addition to these active workers in tropical disease, it would be well that this organization should include others whose positions may prevent them from becoming immediate contributors to our knowledge on this subject, but whose attainments or interests are such that their opinion and counsel might contribute to progress in this branch of study.

The second important function of a society of Tropical Medicine should be its public and educational influence. This association ought to bring before the public, medical and lay, those prophylactic measures against the spread of various grave epidemic diseases with which we are constantly menaced. Our voice should actively be raised, not only in warning but in the proposition and explanation before the American Medical Association and through this, before State, county and municipal authorities, of practical protective measures.

The first question which we might profitably consider, relates, it seems to your President, to the matter of membership. There are at present upwards of one hundred and twenty-five members of the Society of Tropical Medicine. The membership is limited to two hundred. This is a large society, but no larger, it seems to me, than is justified by the nature of the organization.

The qualifications for membership have, in the past, been few, little beyond an interest in tropical medicine, and a good general standing in the profession.

Many of our members and officers have been men who, while manifesting a deep interest in the objects of the society, have yet contributed little to the subject themselves. Your present President regrets that for some years his contributions to this branch of medical study have been exceedingly small. He is inclined to believe, nay, he is sure, that some of those who have done most valuable work on subjects pertaining to Tropical Medicine, whose coöperation we need most urgently, have tended to hold aloof from this Association, because they have felt that it was rather a local society composed of members from the Eastern cities, than a representative national organization, and I must say, from their standpoint, that of one looking on from without, and ignorant of the truly disinterested motives of those who founded the body—from this standpoint, I say, there has been some justification for such a sentiment.

They know, for instance, that the requirements for admission to many, indeed most of the special societies are such that only those who have devoted themselves to the study of the problems which occupy the association, and have published original contributions of real value, are eligible for membership; they know that, even then, the special qualifications of each individual proposed are carefully considered by the council before his name is presented to the society. This results in the practical limitation of membership to such men as are truly active students.

Again, in some associations, in order that the limited membership may not be overburdened by non-productive associates, rules are made which permit:

1. The placing upon the honorary list of those whose membership has lasted for more than a certain number of years, and

2. The dropping from the list of membership of such persons as shall have been absent from say three consecutive meetings of the society, without proper excuse, or who shall have failed to produce a piece of medical research within a given period of years.

Is it true that some such measures are necessary and essential for the preservation of an active special society? Are there not advantages in having the society open to all? Look, for instance, at that which is accomplished yearly in the various sections of the American Medical Association. Is this work not, after all, as good as that accomplished by any of the special societies? What, then, is the

field for a special society? This is a problem which might well admit of discussion were it a question of founding a new society. What admirable work is done in the special sections of the American Medical Association is known to all. But this is not a new society, and the remarkable quality of the papers and discussions at the meetings of the American Medical Association have not been regarded as a sufficient reason for the abolition of other special societies, such, for instance, as the American Neurological Society, the Association of American Physicians, the American Surgical Association or the American Paediatric Society. These societies bring together annually, a limited number of special students. There are advantages, and great advantages, in an organization so large that it may include all who have a real interest in the subject to which its researches are devoted. The American Medical Association, that true centre of all matters medical in this country, represents such an organization, and it is highly probable that the day will come when a special section of the American Medical Association is devoted to the consideration of tropical diseases. But along with the work which we do in the American Medical Association, many of us find valuable opportunities for effort in the various special societies, where the active workers in each field are brought together in a quiet way and freed from the distractions of a large assembly. I believe that there are duties which a special society of limited membership is peculiarly fitted to undertake. Some of these functions which are distinctly of a public nature I shall touch upon later.

The council, considering these questions at its annual meeting, concluded:

1. That in the future they would present to the society as candidates for membership only such individuals as have published original work of real value in the field of tropical medicine, or who, through other special attainments or position, are peculiarly fitted to give valuable counsel to the organization.

2. That every applicant for membership shall be proposed by two members neither of whom are officers of the society; each of these proposers shall write personal letters to the council, setting forth the special qualifications of the individual proposed. With this proposal there shall be submitted to the council a full list of the contributions of the individual whose name is suggested, upon subjects allied to tropical medicine, with full titles and references to the year, volume and page of the publication in which they have appeared, together with reprints of each article whenever possible. All proposals for membership shall be made at the annual meeting. So soon as possible after the annual meeting a complete list of those nominated for membership are to be sent to each member of the society.

3. That a stated meeting of the council shall be held on the evening before the annual meeting of the society. At this meeting the names and qualifications of those individuals proposed for membership shall be discussed and a selection made of those who shall be submitted to the society. At the same time the names of nominees for the various offices in the society shall be prepared.

A grave difficulty in connection with the selection of the officers for this society lies in the fact that many of the most valuable members are stationed at distant points, and are therefore unable to attend meetings of the council. The majority of members of the Association of American Physicians, for instance, come from large centres of the East or Middle West, and can easily be brought together. Some of these difficulties might be remedied by fixing the annual meeting at a time when it may be especially easy to bring the members together. Such a date would seem to be the day before the meeting of the Ameerican Medical Association, excepting, perhaps, on those dates when we may hope to gather with the Congress of American Physicians and Surgeons. If, in the future, a special section of tropical medicine should be organized in the American Medical Asso-

ciation, we may then arrange our meeting at some other time.

Your President believes that by the adoption of these or similar measures this society may be made more homogeneous, more representative and more useful.

The second great end which our organization ought to serve is a more definite public function. A body such as this association should be particularly fitted to educate and advise on matters of public health in its relation to those special conditions in the study of which we are engaged. And what need there is for just such advice! In the few moments which remain I would suggest, as examples, but two problems with regard to which this body might render real public service.

1. The first is the old but ever new question of the prophylaxis against malarial fever. When we look at what has been done in Italy, Suez, many points in India and Africa and in Panama, and then turn to the article of Dr. Howard in Ross's recent book upon the prophylaxis of malaria, we may well hide our heads for shame. There has been scarcely a single public measure taken in the most malarious districts of America to save the hundreds of lives which are being sacrificed yearly. We sit with folded hands and wait for some one else to take the initiative. Why should we not, as a body, appoint a committee to make a complete report as to those measures which might be most practical, and easy of adoption, in different parts of this country?—a report which might set the matter clearly before government, city, county and town officials. Such a report, setting forth definte advice as to measures which should be taken, with estimates as to the expenses and means, might be presented to the American Medical Association, and to its constituent branches, might be published in the newspapers, and might well bring about action in many regions. It would certainly help in the education of the public and in the saving of human lives. The committee should be small, consisting of no more than three members, all of whom should have had practical experience in the study and application of prophylactic measures against malaria.

Perhaps in this way we may help to save some of the many lives lost yearly and the vast sums of money which are needlessly thrown away, largely through the lack of knowledge of our people.

There is another question which we, as a people, ought to have very much in mind at the present time. I refer to the question as to what measures should be taken against the possible entrance and spread of bubonic plague. There are many reasons to fear that, at any time, this scourge which, at the present moment, is peculiarly widespread, might appear amongst us on the Southern or Eastern coast. What an easy foothold plague might gain in some of our old, rat-infested cities is not hard to imagine. What was accomplished in San Francisco and on the Pacific Coast largely under the lead of one of our members who is with us today, is well known to all. But when one thinks of the difficulties under which he and his associates worked at first—of the extremities to which private interest, blinding the eyes of those in power, lead a misguided public in a community so wide awake and progressive as San Francisco, one trembles to think what might happen under similar circumstances elsewhere. Ought we not, as a society, to endeavor to impress upon the public the dangers to which we are exposed and the measures of protection which we ought to take.

I had hoped to be able to announce the appointment of a committee to report next year, if possible, upon the subject of bubonic plague, but various unavoidable events have unfortunately delayed the arrangements. I hope most sincerely that some such body may later be constituted.

There is another matter of public importance which I would lay before the Society. In 1915 the Panama Canal, the construction of which was rendered possible by the work directed by our distinguished member and late President, Col. Gorgas, will formally be

opened. At a recent meeting of the Medical and Chirurgical Faculty of Maryland a resolution was passed urging that a Congress of Tropical Medicine be held at the same time to celebrate the triumphs of preventive medicine which have made this great work possible. It would seem to be our special duty to take the initial steps in this matter. The suggestion seems most apt and most fitting, and your President would suggest that negotiations should immediately be undertaken with the authorities in charge of the Panama Exposition to ascertain whether such a Congress might not be made an important part of the official program. In order best to assure the most general and distinguished cooperation, the organization of such a congress should, if possible, be undertaken in connection with the International Society of Tropical Medicine, of which this body is a member. Nothing could be more fitting than such a gathering on such an occasion.

And now the time has come to enter upon the excellent program which lies before us, but before we begin I would express a word of appreciation to the local committee for the admirable arrangements which have been made for this meeting.

For a number of years it has seemed to some of us that a gathering of this Association in New Orleans might be of particular value. New Orleans, the metropolis of the midi, as our Gallic friends so happily call the South, is particularly interested in the objects of this Society. This city has furnished the country and the world with an inspiring example of what can be done by honesty, alertness, courage and energy in stamping out a terrible epidemic, and in the program in which your local committee has so generously prepared for us, there is ample promise that the members of this Society will not regret that New Orleans was chosen as our meeting place today.

But one disappointment mars the pleasure of the charming greeting which you have accorded us in New Orleans—and that is that we have, as yet, heard no announcement of a substantial bequest or donation to Tulane University for the foundation and maintenance of a Department of Tropical Medicine.

No greater service could be rendered to this city, this State or to our common country than the fitting endowment of such a chair.

One thing more. The extremely happy inspiration of the Committee of Arrangements in suggesting the invitation of the members of the societies of this and neighboring States to attend this meeting should add greatly to the value of the gathering.

The Society of Tropical Medicine welcomes you, gentlemen, most cordially—you should bring to us knowledge and experience in many of the matters in which we are especially interested. We appreciate your presence and we shall welcome your counsel.

Soyez les bienvenus!

SECRETARY'S REPORT, AMERICAN SOCIETY OF TROPICAL MEDICINE

By JOHN M. SWAN,
Watkins, N. Y.

During the year that has passed since the last meeting of the Amreican Society of Tropical Medicine the bulk of the work of the Society has been performed by the Secretary by correspondence.

The Council met in Baltimore on April 22, 1911, at the invitation of the President. Dr. Thayer, Dr. Guiteras, Dr. McFarland, Dr. Futcher and the Secretary attended the meeting, at which several important matters were decided upon.

It was voted that the Council recommend that the Society hold its ninth annual meeting in 1912, on the day before the meeting of the

American Medical Association, and in the same city, and that the Council meet the night before the meeting of the Society.

It was voted that in future all candidates for active membership in the Society must submit to the Council a list of papers written on subjects bearing upon Tropical Medicine, furnishing reprints whenever possible, and that the proposers should send letters to the Council setting forth the qualifications of the candidates that they recommended.

The Council nominated the following officers to be voted upon at this meeting:

President, Dr. Rudolph Matas, New Orleans.

Vice Presidents, Dr. Judson Daland, Philadelphia; Dr. Richard P. Strong, Manila.

Secretary, Dr. John M. Swan, Watkins.

Assistant Secretary, Dr. Allen J. Smith, Philadelphia.

Treasurer, Dr. C. Lincoln Furbush, Philadelphia.

Councillors (to serve two years), Dr. Ramon Guiteras, New York City; Dr. C. C. Bass, New Orleans.

Since this action was adopted Dr. Matas has declined positively to be a candidate for the Presidency, and the Council recommend Dr. Joseph H. White, of New Orleans, for the office.

At the time of the last annual meeting the Secretary referred to his retirement from active work in Tropical Medicine and volunteered to retire from his office. The Council thought it best that he remain the Secretary, and the Council took this view of the matter again this year. Last year the Society gave the Council the power to appoint an Assistant Secretary, and Dr. Allen J. Smith, Director of the Courses of Tropical Medicine in the University of Pennsylvania, was appointed to that office. In January of this year the property of the Society was moved from the Secretary's former office in the Philadelphia Polyclinic to the Assistant Secretary's office in the University of Pennsylvania.

The Council recommended that the President appoint a committee of three at this meeting to report upon the available measures for the prophylaxis of plague in the United States at the 1912 meeting. The Council referred the action on the propositions for membership received since the last annual meeting to the President and the Secretary with power to act. The Secretary sent letters to those who proposed candidates requesting information about their work in Tropical Medicine. The President and the Secretary therefore recommend the election to active membership of the following candidates: Dr. Sidney K. Simon, New Orleans; Dr. Milton J. Rosenau, Boston; Dr. John D. Long, United States Public Health and Marine Hospital Service.

The committee appointed in 1909 to consider the advisability of founding a School of Tropical Medicine in the United States has made no report to the Council.

The fifth volume of Transactions has been unavoidably delayed, but will soon be in the hands of the members. Members are reminded that in order to facilitate the publication of the Transactions the papers would better be sent to the Secretary with the author's preference as to the journal in which they should be published, so that the reprints may be ordered in proper form.

The collection of lantern slides was increased by the gift of a series of slides, illustrating pellagra, by Dr. C. C. Bass at the last annual meeting.

Library—Last year the library consisted of 22 bound volumes and 1,106 pamphlets and numbers of medical periodicals. During the year three bound volumes and 311 pamphlets and medical periodicals have been added, making the library now contain 25 bound volumes and 1,417 pamphlets and medical journals.

Membership—In 1910 the membership in the Society was as follows: Active members, 131; corresponding members, 17; honorary members, 42. During the year one honorary member died, His Excellency, Robert Koch, and one honorary member has resigned and applied for active membership, Dr. Milton J. Rosenau.

At the St. Louis meeting it was voted that

any active member who was five years in arrears of dues be dropped from membership after he was notified of the action of the Society and the amount in which he was in arrears. In accord with this resolution seven active members have been dropped. Four active members have resigned. The membership on May 18 is 120 active, 17 corresponding and 40 honorary members.

Accessions to library:

Isthmian Canal Commission. 12.
New York Medical Journal. 29.
United States Public Health and Marine Health Service. 43.
Royal Academy of Medicine of Belgium. 6.
Revisto del Circulo Medico Argentino. 6.
Anales de la Academia de Ciencias Medicas Fisicas y Naturales de la Habana. 6.
Bulletin de la Societe Pathologique Exotiqu. 6.
L'Institut Imperial de Medicine Experimentala St. Petersburg. 1.
Society of Tropical Medicine and Hygiene. 6.
Philippine Journal of Science. 9.
Sleeping Sickness Bureau, Royal Society. 9.
Gulf States Medical Journal. 6.
United States Naval Medical Bulletin. 1.
Bailey K. Ashford. 1.
S. T. Darling. 1.
C. L. Alsburg. 1.
Henry B. Ward. 4.
E. N. Tobey. 2.
Sanidad y Beneficencia Habana. 1.
University of Upsala. 3.
Real Accademia de Medicine di Roma. 6.
China Medical Journal. 2.
Leonard Rogers. 2.
John Guiteras. 1.
W. C. Gorgas. 1.
C. F. Craig. 2.
W. P. Chamberlin. 1.
E. D. Kilbourne. 1.
John M. Swan. 40.
Southern Medical Journal. 6.
New Orleans Medical and Surgical Journal. 1.
Bulletin of Manila Medical Society. 2.
Thomas W. Jackson. 1.

The following resolution was passed upon motion of Dr. J. Birney Guthrie, of New Orleans:

Resolved: That as the American Society of Tropical Medicine, at its meeting held in New Orleans on May 18 and 19, 1911, has heard the announcement of the death of one of its most illustrious honorary members, His Excellency Robert Koch, of Berlin, this Society do place on record its sense of great loss to scientific medicine, which results from the cessation of the activities of this master in these fields of inquiry.

Resolved: That the Secretary be directed to spread this action on the minutes of the Society.

CERTAIN SEPTICEMIAS RESEMBLING YELLOW FEVER; THEIR BEARING ON PRACTICAL QUARANTINE.*

By JOHN W. AMESSE,
Late P. A. Surgeon, P. H. and M. H. S.; Lecturer on Tropical Diseases, Medical Dept., Univ. of Colorado.

To those unfamiliar with the protean manifestations of yellow fever, a casual consideration of what authors are pleased to call its pathognomonic symptoms would seem to predicate a prompt and unequivocal diagnosis.

As a matter of fact, few infectious diseases offer such problems to the clinician or the health officer, and to fewer still are attributed more grievous lapses of professional judgment.

In the latest contribution of Dr. Agramonte (1), the only surviving member of the Army Board which placed yellow fever definitely among the preventable diseases, this point is fittingly presented as a foreword to his exhaustive consideration of treatment.

It is not an uncommon thing, for example, in the deliberations of the Commission for the Diagnosis of Infectious Diseases at Havana, for suspicious cases to be deferred several times, the members being unable to concur in their findings, notwithstanding the fact that this Commission includes the foremost

*Read by title at the Eighth Annual Meeting of the American Society of Tropical Medicine held in New Orleans, May 18 and 19, 1911.

living students of yellow fever under the direction of Finley and Guiteras.

Likewise, during the New Orleans epidemic of 1905, the Emergency Hospital to which all suspects were transferred, harbored, throughout the summer, cases of typhoid, malaria and septicemia.

With this in mind, I have no hesitancy in submitting these observations to the Society, believing that until the microbic origin of yellow fever is determined, any light shed upon the important and difficult features involved in differential diagnosis will be appreciated.

Among the affections to be considered and eliminated before the diagnosis of yellow fever is justified none are more baffling than the group of diseases included in the general term infectious jaundice, or icterus gravis.

Unquestionably septicemic and usually hemorrhagic in character, of sudden onset and hidden origin, they resemble so closely the picture of the more severe invasions of yellow fever that one with difficulty maintains an unbiased attitude in their consideration.

From this group, Weil's disease is purposely omitted, there being no question in my mind that in these latter cases we have to deal with an intoxication, or as McFarland (2) aptly expresses it, an acute febrile icterus, rather than a specific infection.

Weil's original paper (3) was based upon four cases appearing in persons handling putrid food, and were probably frank instances of ptomaine poisoning. Numerous observers have since reported similar cases, the mortality being invariably too low to make a proper estimate of the morbid changes possible.

Of decidedly differing character, however, are the serious disorders involving the liver and gastro-intestinal tract, running a short, sharp course, and furnishing a death rate varying from 25 to 60 per cent.

Cases of this type have usually been reported from tropical and sub-tropical localities, the clinical features being practically identical, whether observed in the Eastern or Western hemispheres, and justifying the conclusion that identical etiological factors are concerned.

The most illuminating study of icterus gravis was made by Emilio Martinez, of Havana (4), in 1888, although accurate descriptions of the disease have appeared in the literature from the earliest times, Horaczek publishing the first monograph early in the nineteenth century.

In a recent communication from Dr. Martinez, bearing upon this work, he declares that nothing has developed in the subsequent twenty-three years of careful observation to modify his original views on infectious jaundice.

The infrequency of these cases in our own Southern States is a prime factor in strengthening the suspicion of local sanitarians that such a diagnosis is a subterfuge to conceal quarantinable disease.

During my service as sanitary observer for the United States at Havana, I have repeatedly received protests of this kind from health officers along our Southern seaboard.

From personal notes of twelve such cases occurring in Cuba, from the thesis of Martinez and from the studies of Sandwith (5), we may briefly describe the affection as follows:

Definition—An acute infectious, non-contagious disease characterized by fever, jaundice, splenic tumor, nephritis and profound nervous manifestations.

Geographioal Distribution—West Indies, Mexico, Central America and the Mediterranean Coast.

Etiology—Males from 15 to 30 years are most frequently attacked, and especially those who have recently arrived in a given locality.

Unhygienic surroundings, an unsuitable dietary, exposure and alcohol are contributory factors.

While no organism has been definitely associated with this disease, we may conclude from analogy and from the results of animal experimentation that an infectious jaundice can be produced by members of the Proteus group, the Colon group or by the Bacillus Mucosus Capsulatus, giving rise to no wider

range of symptoms than is found in any series of yellow fever cases.

Morbid Anatomy—The meninges are usually ecchymotic and stained with bile; the heart is pale and flaccid, with granular and fatty degeneration of its fibers.

Enlargement of the spleen is common, in contrast to the findings in yellow fever. The stomach shows capillary hemorrhages in the mucous membrane; the intestine may likewise be studded with petechiae and its contents are clay-colored.

Characteristic changes in the kidneys are noted; they are enlarged and softened, the capsule strips easily, the cortex is intensely congested. Microscopical study will reveal fatty and granular degeneration.

The liver is usually enlarged, of a dark red color with the lobules indistinct and the individual cells showing fatty degeneration or cloudy swelling. The portal canals may be infiltrated with lymphocytes.

Symptoms—The onset of icterus gravis may be gradual or acute. In either event, fever, nausea and vomiting supervene, with pronounced nervous symptoms, of which insomnia is the most constant. Jaundice appears early, usually on the second or third day, and becomes intense. The urine is scanty and high-colored, with increased urea and bile pigment, but no marked albuminuria until later in the attack.

Hemorrhages are an invariable feature, beginning ordinarily with epistaxis. Ecchymoses and hematemesis may follow, or in females, menorrhagia.

The pulse for the first few days is rapid, but with the increasing jaundice it drops to 60 or 65, rarely to the point ordinarily reached in yellow fever.

The stools are clay-colored.

Blood examinations show a marked leucocytosis and a decrease in the hemoglobin.

Duration—Martinez finds the three stages —invasion, fever and decline—are commonly covered in eight to fifteen days; Sandwith's cases average twenty-one days.

Mortality—The death rate in infectious jaundice is high. Of 58 cases reported by Martinez, 45 died and 13 recovered. In 12 cases studied by myself, through the courtesy of Dr. Juan Guiteras, 7 died and 5 were discharged cured. In 300 cases at Alexandria, the mortality was 32 per cent.

Diagnosis—From the foregoing discussion of the clinical and pathological phenomena observed in primary infections of the biliary system, it is apparent that in the differential diagnosis, especially in so much as the elimination of yellow fever is concerned, the sanitary inspector should possess not only a broad, general knowledge of these affections, but should approach each case, regardless of its origin, with a mind free from prejudice and preconceived ideas of the health status at any given port.

While nothing can equal the value of actual intensive study of both diseases, the following contrast in the salient features is offered as a guide in doubtful cases, particularly those in which the history is indefinite:

INFECTIOUS JAUNDICE.	YELLOW FEVER.
1. Fever-septic type, continuing from 8 to 20 days.	1. Either a gradual decline, after the initial rise, or a continuous fever with slight oscillations for several days, declining rapidly to normal. Remittent and intermittent types are common.
2. Jaundice—appearing on the second day and raidly assuming a deep bronze or greenish-yellow cast.	2. Discoloration of sclerotics on second or third day, followed by generalized jaundice of a pale straw color.
3. Albumin — traces on third or fourth day; large amounts are uncommon.	3. Albumin in quantities on second day, rapidly increasing in volume up to as much as 75 or 80 per cent.
4. Pulse—Responsive to temperature; rarely falls below 60.	4. Irresponsive to temperature after second day; a failing pulse with rising temperature, as noted first by Faget.
5. Stools—Clay colored or white.	5. Normal or tarry stools.
6. Liver and spleen enlarged.	6. Normal size.
7. Insomnia marked.	7. Sleeplessness may or may not be present.
8. Hyperleucocytosis; hemoglobin much reduced.	8. Hyperleucocytosis; hemoglobin 90 to 105.

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2. Text Book upon the Pathogenic Bacteria. 1905.
3. Deutsch Arch. fur klin. Med. 1886, Bd. XXXIX, 209.
4. Curabilidad del Ictero Grave Primitivo, Habana, 1888.
5. British Medical Journal 1904. Vol. II. Page 672.

REPORT OF A PROBABLE CASE OF SPRUE.*

By SIDNEY K. SIMON, M.D.,
New Orleans, La.

Sprue may be defined as a type of chronic inflammation of the gastro-intestinal tract, even in whole or in part, of as yet unknown etiology and having its origin practically always within the tropical regions of the world.

The disease, when fully established, presents a fairly constant clinical picture, the main features of which are:

A peculiar form of superficial inflammation and erosion of the mucous membrane of the mouth and tongue—the so-called Ceylon sore mouth.

A persistent diarrhoea, with remarkably copious, frothy, pale stools.

Dyspeptic disturbances of a varied nature.

A slowly progressive emaciation and secondary anemia.

There is a marked tendency to relapse exhibited, following variable periods of apparent recovery. During the quiescent stage the patient might even take up his residence outside of the tropical zone, only to fall victim again to a fresh exacerbation of the trouble, perhaps within a few months. The foreign resident in the tropics seems to be particularly predisposed.

The course of the disease varies considerably both in its progress and in its severity, in some instances having a fatal outcome within one or two years, or again, perhaps, dragging along intermittently for as long as fifteen years. All the authorities agree that unless recognized and checked in its initial stages, the outlook is exceedingly grave. Unfortunately, in the incipiency, the diagnosis is always attended with difficulties, the disease exhibiting in many of its features a close kinship with other morbid processes in the tropics.

Most difficult of the symptoms in sprue to interpret is the diarrhoea, since diarrhoeas of all varieties and types are unusually common affections in the tropics. In sprue, however, the diarrhoea in the way is somewhat distinctive.

The stools, as has been said, are remarkably voluminous and frothy, due to active fermentation of the undigested refuse, to a degree not seen perhaps in any other intestinal disturbance. They are silver-gray or pale-yellow in color, of exaggerated odor, and without mucus, blood or other evidences of an active inflammation. On microscopic examination the most striking finding is an excess of fat in its various forms. In spite of the color, bile pigment is rarely missing.

The number of passages per day, under ordinary circumstances, is not immoderate (1-6), and the patient rarely complains of pain or other bowel discomfort. A diarrhoea such as this, though undoubtedly odd and rare in type, cannot, however, be considered as exclusively belonging to sprue. In the tropics, as well as in other lands, a similar type of diarrhoea might result from the exclusion of the pancreatic juice from the intestinal canal or from a pathological interference with the absorption of fat through the intestinal wall, such as one meets occasionally in cases of enteric tuberculosis or carcinoma, or even chronic appendicitis, as

*Read at the Eighth Annual Meeting of the American Society of Tropical Medicine, held in New Orleans, May 18 and 19, 1911.

Van der Sheer claims. There is need, therefore, for caution in the interpretation of the fatty diarrhoea of the tropics, and according to the best authorities a diagnosis of sprue should never be made merely upon the basis of an intestinal disturbance. It must be remembered that in sprue each segment of the alimentary tract may be involved, apart from the intestines, though not necessarily simultaneously or in equal degree.

Characteristic lesions in the mouth are rarely missed at some stage of the disease, and in conjunction with the diarrhoea may be said to fulfill the main requirements of the diagnosis.

An important feature of these mouth lesions is their highly transitory character, often appearing and disappearing within short periods and then usually coincident with some temporary disturbance in the stomach or bowels. On the other hand, however, the stomatitis may be a constant symptom throughout the course of the disease, and in some of the Eastern countries, in fact, cases of sprue are reported with the sore mouth as the sole feature. The tongue and buccal mucosa share equally in the inflammatory process, which is essentially a superficial one, showing a tendency to rapid exfoliation of the epithelium, with erosions. The patches thus give the appearance of being raw and angry, and most often are highly painful and sensitive. There may also appear from time to time small apthous-like ulcerations upon an inflamed base, especially along the edge of the tongue. As the disease advances to the end, the tongue shows a tendency to atrophy, finally becoming hard and pointed, with a smooth, dry and often fissured dorsum.

This play of morbid processes in the mouth represents in fair way the sequence of pathological changes along the entire gastro-intestinal canal.

According to Manson, the early lesions in the intestines and stomach simulate very closely the type of superficial inflammation as seen in the mouth. This is followed in time by a general atrophy of the glandular and muscular structures, due, as he claims, to the direct effect of the specific toxin of the disease. Be that as it may, the autopsy of an advanced sprue always reveals an extreme grade of atrophy of the gastric and particularly of the intestinal wall. This, in a striking way, explains the entire hopelessness of the disease in its later stages. The high degree of anemia and emaciation suggesting an adult marasmus, is the result both of the systemic toxemia and of the inanition which follows upon the interference with the digestion and absorption of food products. The patient with sprue, if left to live out the disease, may truly be said to die of a slow starvation of every tissue and organ of his body.

As to the cause of this interesting condition little definite is known. The inference is strong, however, that it is an infection, though a specific organism has as yet not been found. Many of the well-known intestinal parasites of the tropics have been accused in turn, but in each instance they have been found to be merely secondary invaders. Again, pregnancy, syphilis, malaria, meteorological changes, which from various sources have been proclaimed as actual causes of sprue, may be looked upon at best as mere predisposing factors in the etiology.

To this brief resume of sprue I wish to append the clinical notes of a patient from the tropics seen this past March (1911), whose case, I believe, presents sufficient grounds to be classed under this heading. This patient I saw through the courtesy of Dr. Randolph Lyons, of this city, to whom I am indebted both for the privilege of observing and reporting the case, as well as for many of the clinical notes.

J. R. H., white male, age 44, married, a native of South Carolina, had resided in Port Barrios, Nicaragua, for seventeen years, serving during that time as American Vice-Deputy Consul. This long period of residence in the tropics had been unattended with serious illness of any kind, up to the onset of his present trouble, two years ago.

Family history negative.

Past History: At the age of 16 the patient

contracted syhpilis, and though apparently cured of this infection, claims never to have considered himself since then of strong constitution. Off and on for many years he had also been a sufferer from chronic dyspepsia, which, from his history, was evidently a type of gastric neurosis. He had had malaria for a short period three years ago, which responded readily to quinine. His habits had always been good.

The present disturbance began insidiously about two years ago, with a mild diarrhoea, which at first seemed to give the patient no particular worry. There was no temperature or pain, and his usual health, otherwise, was not impaired. Gradually, however, the stools increased in number (with seven to eight) and his attention became directed to the peculiarly large amounts at each evacuation, in spite of his moderate dietary. His indigestion had also become aggravated by this time, and for the first time in his life he was annoyed with a soreness and ulceration of the mouth, which he claims first caused him to seek medical aid. This was about four months from the onset of the disease. The disturbance from that time made steady progress, with only temporary periods of improvements varying from one to three weeks. The slightest indiscretion of diet would bring on a return of the diarrhoea and a reappearance of the raw spots in the mouth. His strength began now to fail rapidly and his weight was gradually reduced from 170 to 105 pounds shortly before his death. Throughout the entire course of the disease the patient claims he had never experienced any cramp pains in the abdomen or even tenesmus. There had been no cough, dyspnea or edema. The temperature never rose above normal. The large, yeasty, pultaceous stool was an almost constant daily feature during the two years of his illness. The patient came under observation first in this city, March 13, 1911. At that time he presented the following clinical picture:

General appearance:—
Extreme degree of emaciation, with a dry, wrinkled, almost transparent skin. Muscles flabby. Pale, muddy complexion. Deep sunken eyeballs. Sclera faintly tinged with yellow.
Tongue:—
Small, hard, with pointed tip. Dorsum remarkably smooth and pale. No erosions.
Lungs:—
Negative.
Heart:—
Sounds weak. No murmurs.
Pulse:—
Regular; tension low; rate, 74. Radials, thickened.
Abdomen:—
Retracted, but resonant. Generally sensitive to touch. Peristalsis occasionally visible through the abdominal wall.
Liver and Spleen:—
Not palpable.

The stools, on repeated microscopical examinations, failed to reveal the presence of any intestinal parasites. There was, however, noted constantly an excess of split fats, the fatty acid crystals and soaps. The color of the stools varied between a pale yellow or brown, and the odor was always exaggerated. A few flakes of mucus could be detected, but the tests for occult blood were negative.

The urine was of low specific gravity (1008-1012), acid, and free from albumin, sugar and indican. Urea estimation, 1 4-10 per cent. A few hyaline casts were found.

The gastric analysis, after test breakfast (Ewald), showed quantity 200 c. c., small amount of mucus, no stagnation. T. A. equals 8, H. C. L. equals 0.

Blood:—
Hemoglobins, 65 per cent.
Red cell count.....2,860,000 Color inder, 1.1
White cell count..... 9,780
Differential count:—
Polymorph 76
Small lymph.....18 500 cells counted.
Large lymph..... 6
Eosinophiles
Polychromophilia. Three normoblasts found.

The patient's condition after coming under observation was one of gradual decline and he died in stupor, March 24, 1911. Unfortunately, an autopsy could not be obtained.

THE PROPHYLAXIS OF MALARIAL INFECTION.*

By CHARLES F. CRAIG, M.D.,
Captain, Medical Corps, U. S. Army,
Washington, D. C.

The prevention of malarial disease must ever be of vital interest and importance to the people of the Gulf States and the Mississippi Valley, for in these regions there annually occur many thousands of cases, a very considerable proportion of which are of pernicious type. Many localities are practically uninhabitable by reason of the severity of these infections, while in others the inhabitants lead an existence rendered miserable by frequent and repeated attacks of malarial fever. It has been stated by Seale Harris that the deaths from malaria in the State of Alabama average over one thousand per year, while in Louisiana and Texas the death rate is still higher. However, it should be remembered that the death rate from malarial disease is a poor index of the injury actually inflicted upon a people by these infections.

Within recent years much money and labor have been expended in efforts to eradicate hook-worm disease from infected districts in the United States, but, in the writer's opinion, the malarial infections present in many of these districts are of vastly greater economic importance than the infections with uncinaria, yet very little has been accomplished, or even undertaken, in the prophylaxis of malaria in most of our infected States.

By reason of its method of transmission malaria is peculiarly prevalent in children and young adults, and in badly infected regions the rate of infant mortality depends very largely upon the natural resistance possessed by them to the toxins of the malarial plasmodia. An examination of the blood of children in malarial localities has always shown a large percentage of infections; thus Koch, in West Africa, found 100 per cent of children under two years of age infected in certain localities, while in less badly infected regions the percentage varied from 10 to 20 per cent.

Koch's results have been confirmed by Stephens and Christophers and by James. Stephens and Christophers, at Accra, West Africa, found from 23 to 90 per cent of babies infected; up to eight years of age, 20 to 57 per cent; up to 12 years of age, 28 to 30 per cent,; and after the twelfth year infection was found to be rare. At Lagos, of children under two years of age, 50 to 100 per cent were infected; from two to five years, 40 to 75 per cent, and from five to ten years, 25 per cent.

James, in India, found that the percentage of malarial infection among native children varied greatly in different localities, being zero in some places and as high as 86 per cent in others. Thus, at Mian Mir, children up to three years of age showed 80 per cent infected; up to five years, 66 per cent; up to ten years, 50 per cent, while after ten years none were infected. At Ennur, children up to three years of age showed 65 per cent infected; up to five years, 51 per cent; up to ten years, 46 per cent, and up to fifteen years, 16 per cent.

While in severely infected regions a relative immunity is generally observed in the adult population, there are numerous exceptions to this rule. Thus in India, Hope found at Pabna that 922 adult natives showed plasmodia in their blood, while only 862 children examined at the same time presented them. In one of the most malarial localities in the Philippine Islands I found that 62 per cent of adults showed the plasmodia, and 72 per cent of children. In West Africa A. Plehn found 60 per cent of adults infected and 94 per cent of children under two years of age, while 85 per cent of children between five and ten years

*Read before the Medical Association of the State of Alabama, Montgomery, April, 1911.

of age showed infection. It will thus be seen that while in many badly infected regions the adults show a smaller per cent of infection, the immunity possessed by them is only relative and that a very large proportion are still suffering from latent malarial disease.

The observations just cited were made largely upon children and adults showing no symptoms of malaria at the time of examination; in other words, the disease was latent, and the great importance of these latent infections from a prophylactic standpoint will be considered in another portion of this paper.

It cannot be doubted that if the blood of children could be examined in the badly infected districts of our own country the percentage of latent malaria would be found to be similar to that observed elsewhere. Unfortunately almost nothing has been done in this country in the direction of determining t' actual amount of latent malarial infection present in any community, but the observations of Sims and Warwick prove that latent infection must be regarded as a factor of prime importance in dealing with the prophylaxis of malaria in the United States. These investigators examined the blood of children at Talladega, Alabama, and found that between 8 and 9 per cent were infected, and that of these only 3½ per cent developed malarial symptoms within five months, even though the plasmodia could be demonstrated in the blood during this time. Such observations as these are of the greatest practical value and should be repeated by physicians throughout the South, and within a comparatively short time we would possess definite knowledge of the extent of malarial infection in each State and would be enabled to prevent the transmission of the disease by properly treating the latent infection in apparently healthy individuals.

Experience has shown that malaria is essentially a disease of childhood in regions where the infection is endemic, and only those children survive who offer the greatest resistance to the malarial toxin or toxins. In this way a relative immunity to the effects of the plasmodia is acquired, but at the expense of the vital functions, leaving the individual weakened and less resistant to other infections, and mentally and physically less able to bear the burdens and share in the labors of adult life. Malaria may be said to prepare the soil for the hookworm by sapping the vitality of the young child, thus rendering what would otherwise be a mild hookworm infection, one of severity. It is astonishing that with all the careful work which has been accomplished in the elucidation of the symptoms of hook-worm disease, practically no attention has been paid to the effect of antecedent or coincident malarial infection, though it must be admitted that in many localities these two infections exist together. I have not time to consider this phase of our subject as carefully as it should be, but I am convinced that many of the symptoms generally considered as the result of hook-worm disease are in reality due to long continued malarial infection, and that in regions in which both diseases are endemic, infinitely greater harm is caused by the malarial plasmodia than by the hookworm.

The great economic importance of malaria cannot be overestimated. A people suffering from earliest infancy from malarial disease can never be as productive, either mentally or physically, as a people free from such infections, other things being equal. A survey of the most malarial regions of the world amply demonstrates this fact. Occupations requiring strength and endurance, such as agriculture and mining, cannot be efficiently prosecuted by a people whose physical vigor is sapped by frequent attacks of malarial fever, while the peculiar localization of the malarial plasmodia in the capillaries of the brain, so frequently observed, furnishes an anatomical reason for the lack of initiative and ambition in the victims of this insidious disease. For these reasons the prophylaxis of the malarial fevers becomes an economic duty, and no state or municipality can lose financially by adopting the proper methods for the eradication of malaria.

Before considering the various prophylactic measures which have been found of value in

malaria, allow me to say a few words regarding the diagnosis of this disease. I am well aware that the busy practitioner cannot always base his diagnosis upon the result of the blood examination, if such an examination depends upon himself, but he *can* have the blood examined in a private laboratory or can send it to the city or State Board of Health laboratories. This does not mean that he must withhold quinine until the result of the blood examination is known, for a few doses of this drug will do no harm in any disease, but it *does* mean that within a short time he will know definitely whether his patient has malaria and thus will be able to take the proper precautions regarding the prophylaxis of the disease. Every city or State Board of Health should be prepared to examine specimens of blood free of charge, and every practitioner should avail himself of such facilities. The diagnosis of the malarial fevers should always rest upon the demonstration of the plasmodia and if facilities are afforded by city and State laboratories there can be no excuse for the neglect of a blood examination in any case of fever.

The theory of the prophylaxis of malaria rests upon the fact that these fevers are transmitted from man to man by certain mosquitos and that therefore two factors are absolutely essential to the propagation of the disease, *i. e.*, mosquitos capable of transmitting the plasmodia, and an infected human being. So far as we at present know, the malarial plasmodia can only exist in man and the mosquito, and the methods of prophylaxis based upon this knowledge have invariably been successful when properly applied. The use of quinine in prophylaxis depends upon the fact that this drug is capable of killing the plasmodia during certain stages of their development.

In the prevention of malaria the following measures have been found efficient in practice.

1, The destruction of the mosquitos transmitting the disease; 2, the protection of man from the bite of mosquitos, and 3, the destruction of the malarial plasmodia.

Preliminary to, and absolutely essential for, the success of any method of prophylaxis is the education of the public regarding the essential points in the etiology of the malarial fevers and the success which has attended prophylactic measures.

The methods to be adopted in any region will vary with the local conditions, and common sense must be used here as in every other procedure for the prevention of disease. In some localities we may be able to destroy practically all the mosquitos and thus prevent the spread of the infection, while in others this may be impossible and quinine prophylaxis will have to be substituted, together with protection from the bites of the infected insects. In most regions the best results will be obtained by the combination of all the methods which have been found efficient, and I have little sympathy with those who insist that either in the destruction of mosquitos or the prophylactic use of quinine alone, we must depend for the eradication of the malarial fevers. One must accept conditions as they exist in each locality and adapt his measures to the environment.

1. *The Destruction of Mosquitos.*—The destruction of mosquitos transmitting malaria involves a knowledge of the life history of these insects and of the methods which have been found most proficient in preventing their development or in destroying them, and it is obvious that if we *can* destroy all mosquitos capable of transmitting the disease we may in this way alone entirely rid a locality of malarial infection. This method is the most valuable one we possess when it can be applied, but in many regions the most we can do is to reduce the number of insects and in such localities other methods of prophylaxis will have to be used in conjunction with the destruction of the mosquito.

Mosquitos may be destroyed in either the larval or adult stage of their existence by *chemical, physical* and *biological* methods. It is not my intention to consider in detail these measures nor the methods of applying them, for this knowledge may be found in treatises

upon the malarial fevers, but to call your attention to the principal facts of importance concerning them and to the most valuable measures which have been proven in practice.

Among the chemical methods which have been found most efficient may be mentioned the use of kerosene for oiling breeding places which cannot be drained, and the burning of pyrethrum powder in rooms which contain mosquitos. The first method was advocated by Howard in 1892, and has been used with great success in many localities, but collections of water which are thus treated should be frequently inspected, as the film of oil is apt to be displaced by currents or by the movements of aquatic animals. This method of prophylaxis should only be depended upon where it is impossible to drain or otherwise destroy the breeding places of these insects.

In houses the adult mosquito may be destroyed by burning pyrethrum powder and by sulphur fumigation. These measures are often useful in regions where mosquitos are numerous and where it is impossible to destroy their breeding places or to protect the inmates by the use of screens.

The most important prophylactic measures for the elimination of mosquitos are those which are classed as *physical,* and consist in the destruction of breeding places by drainage and the filling in of low lands; the removal of receptacles that can be used by mosquitos for breeding purposes; and the removal of shelter for the insects.

The most important of all methods of destroying mosquito larvae is by drainage, and this is a measure which may be applied over large areas and has proven of the greatest service in the fight against malaria. The method generally calls for the expenditure of considerable sums of money, and demands the support of local, and often of State authorities, and the cordial cooperation of the sanitarian and the people to be benefited. In the vast majority of infected regions this method is capable of greatly reducing, if not entirely eradicating malarial disease, but the expense involved is often prohibitory and other methods of prophylaxis often have to be adopted. In many regions, however, although the initial expense may be great, the results will more than justify the expenditure.

When drainage is impossible the breeding place of mosquitos may be filled in and considerable areas of swamp land may thus be rendered harmless. Here again the question of expense too often furnishes an excuse for the neglect of a measure which might result in the eradication of malaria from the locality concerned. A most valuable physical means of preventing malaria and one which should always be employed in conjunction with drainage and filling in, is the removal of shelter for the mosquitos, such as is furnished by jungle, long grass and vegetation within or along the banks of streams. The removal of the vines which are so often observed enclosing the porches of houses in malarial districts and of the ornamental shrubs with which the residential grounds are frequently filled, will result in a great diminution in the number of mosquitos and the amount of malaria present in such localities. This method of preventing malaria depends upon the cooperation of the individual property owner, and here is where the education of the public regarding the danger of affording shelter to mosquitos is essential.

A great deal may be accomplished towards reducing the number of cases of malaria in any locality by careful attention to the sanitation of the individual home. The importance of the removal of all receptacles which may contain water, and thus serve as breeding places for mosquitos should be taught the public, for one of the most common observations in malarial regions is the occurrence of such receptacles upon the premises of families who are suffering from these fevers. It has been stated by some authorities that the mosquitos which transmit malaria cannot breed in small artificial collections of water, but this is not true, and I have repeatedly found anopheles larvae in broken bottles or tin cans containing water. Domestic water receptacles, water tanks and wells are often prolific breed-

ing places, and should be covered with screens which are kept in good order and properly used. Empty tins, jars, broken bottles or anything in which water may collect should be removed from the premises, and the small puddles in the streets and yards should be drained or filled in.

In every malarial locality a mosquito brigade, as it is called, may be organized, each member being assigned to a certain district, his duties consisting in a careful daily inspection of the district and the destruction of the larvae in small breeding places and the oiling of larger collections of water. In badly infected regions the entire time of a number of men may be well devoted to searching for and destroying the breeding places of mosquitos, and the small financial expenditure necessary for this purpose should not be considered, as the beneficial results will justify the expenditure of many times the amount.

The *biological* means available for the destruction of mosquitos consist in stocking collections of water with fish, which will destroy the larvae, the use of insects which will devour the adult mosquito, and the introduction into the breeding places of vegetable organisms capable of destroying the larvae and nymphae. These methods have not been very successful in practice and certainly cannot be depended upon alone in the prophylaxis of malaria.

Of the measures which have been mentioned the oiling, drainage or filling in of the breeding places; the removal of shelter for the insects, and the formation of mosquito brigades, are those of the greatest practical value, and one or more of them will be found suitable in every malarial region.

2. *The Protection of Man from the Bites of Mosquitos.*—While the destruction of mosquitos is of primary importance in the prophylaxis of malarial disease, it is but seldom that we can depend alone upon such measures. In the vast majority of instances the most that we can hope to do is to reduce the number of the insects, and it becomes necessary to adopt additional measures for the prevention of infection. Among these the protection of man from the bites of mosquitos is of great value and should always be combined, when practicable, with other prophylactic methods. This protection not only applies to the healthy but to those suffering from the malarial fevers, and may be secured by the use of window and door screens, mosquito nets, head nets, and the use of certain substances placed upon the skin of the exposed individual.

The screening of habitations in regions in which the malarial fevers are endemic is a most valuable prophylactic measure, the objection to it being the expense involved, but the neglect of the measure is in the end more expensive. Copper wire should be used in screening, or, if this cannot be obtained, ordinary iron wire screens covered with two coats of good paint should be substituted. The screening used should contain sixteen meshes to the square inch and should be placed outside the window sashes, thus allowing the window to be raised or lowered without disturbing the screen.

In malarial regions where, for economic reasons, the houses cannot be screened, the use of the mosquito net for the bed should be insisted upon, for this measure alone has greatly reduced the number of infections in many localities where it has been enforced. Especially in the military service has the use of the mosquito net been efficient in reducing the amount of malaria in camps and posts.

The isolation of patients in order to prevent the infection of mosquitos is a measure which is too often neglected by the physician. It is of the greatest importance in prophylaxis, and yet how seldom we see this precaution taken, even in regions in which the malarial fevers are endemic and severe in character. Every malarial patient should be regarded as a reservoir of infection and should be treated accordingly. The forms of the malaria plasmodia which are intended to complete their development within the mosquito appear in the blood of man in from eight to ten days after the appearance of clinical symptoms, and after this period the patients

are infective to the mosquito, but it is probable that in many instances these forms are present even before a definite paroxysm occurs, as we know that malaria may remain latent for a long period of time, the plasmodia in the meanwhile going through their cycle of development in small numbers, so that in order to be efficient the patient should be isolated from the very first day of the disease. This isolation is secured by placing him in a screened room and should be continued until the examination of the blood fails to reveal the presence of malarial plasmodia. Not only is isolation of importance to those surrounding the patient, but also to himself, for if he is not so protected he will later be exposed to reinfection by the bites of insects, which he may have himself infected. If it is impossible (as it often is in the poorer quarters of our cities or towns) to place the patient in a screened room, the bed should be covered with a mosquito net, thus securing a considerable measure of protection. These measures, combined with the proper treatment of the disease, will effectually prevent our malarial patients from becoming sources of infection to the community.

3. *The Destruction of the Plasmodia.*—It is obvious that if we can destroy or prevent the development of plasmodia in infected individuals we will be successful in preventing malaria, as it will be impossible for mosquitoes to become infected. This fact is the basis of quinine prophylaxis, which consists in the administration of the drug to all individuals harboring the plasmodia and to all those exposed to the bites of mosquitoes capable of transmitting the disease. From the observations of many investigators we know that quinine destroys the malarial plasmodia in the blood of man, and I have shown that while it is most effective in the early stages of growth of these parasites it is also capable of destroying them at almost every stage of development with the exception of the forms which are intended to undergo development in the mosquito. While the observations of Darling tend to show that even these forms are affected by quinine, the evidence is inconclusive that the drug actually destroys them, so that quinine prophylaxis cannot be depended upon alone, provided malarial infections have persisted long enough for the development of the gametes.

The most ardent advocates of quinine prophylaxis have claimed that by this method it is possible to rid a community of malaria, but in practice this can only be true in very exceptional instances and where the universal use of the drug can be enforced. Such results can only be obtained by the administration of the drug for a long period of time to every individual in the infected locality, and the prophylactic use of the drug would have to be continued indefinitely, for as long as *Anopheles* were present so long would there be danger of the spread of malarial infection from imported cases of the disease. Quinine prophylaxis is a measure of the very greatest value, but it should not be depended upon to the exclusion of measures for the destruction of mosquitos.

In every malarial locality the latent cases of the disease, which I have already mentioned, are the great sources of infection for mosquitos, and their discovery of the greatest importance in prophylaxis. In regions in which it is impossible to entirely banish mosquitos these latent cases, or "malaria carriers," must be discovered and treated before we can hope to achieve success from prophylactic measures. It is useless to expend time and labor in the destruction of mosquitos in regions where we can only hope to meet with partial success, when the insects remaining are being constantly infected by individuals harboring the plasmodia, and it is in such localities that quinine prophylaxis sohuld be vigorously enforced.

In addition to the discovery and treatment of latent infections, the proper treatment of malarial patients is of the greatest importance in the prophylaxis of the disease. It has been shown that the forms of the plasmodia which are intended to undergo development in the mosquito are but little affected by qui-

nine, and it is therefore evident that we should endeavor to prevent the development of these forms. This can be done by thoroughly treating our malarial patients during the early days of the disease, for such forms do not develop until after the infection has existed for from eight to fourteen days. A very great deal of the malaria prevalent in every locality where civilization exists is directly traceable to improperly treated patients. The practice of regarding malarial infections as cured because the active symptoms have disappeared is a most common and a most pernicious one. It is but too true that the medical profession is largely to blame for this error, for nothing is more frequently observed than malarial patients walking about after only a day or two of treatment, inquiry eliciting the fact that the attending physician has given no directions whatever regarding the continued use of quinine. Such patients almost invariably become carriers of the disease and are constant sources of infection to the community in which they reside. It should be remembered that *all* malarial fevers are resistant to treatment; that the mere disappearance of the symptoms is no index of the destruction of all the plasmodia which may be present; and that a continued course of quinine is absolutely necessary to rid the system of even the mildest malarial infection. In every case quinine should be administered for several weeks after all symptoms have disappeared, and only by so doing may we hope to prevent recurrence or the transmission of the disease to others.

The method of administering the drug as a prophylactic differs with different observers. It is best given in capsule or in the form of tannate of quinine in chocolate troches. I have found in regions where only the tertian and quartan infections occur, that a daily dose of 0.15 gm. (gr. iiss), given in the evening, is ample for protection in most instances, but in regions where the estivo-autumnal fevers are prevalent, larger amounts will have to be taken. In such regions I have found that the administration of 1 gm. (gr. xv) of quinine, upon retiring, given every seventh day, will be effective in preventing the infection. This method I have seen used in some of the most malarial localities in the Philippine Islands, with remarkable results, the malarial rate decreasing over two-thirds after two or three weeks of such treatment. However, better and quicker results are obtained by the administration of 0.65 gm. (gr. x) upon retiring, every third, sixth and ninth night for two or three weeks after reaching the infected locality, and then using the same amount upon every fifth night thereafter.

In latent infections, *i. e.*, individuals showing plasmodia in their blood, although no symptoms are present, quinine should be administered as in active infections until the plasmodia have disappeared, and then given as recommended in prophylaxis.

The impression that quinine prophylaxis must extend throughout the year in malarial localities is erroneous, for in almost every locality these infections are seasonal in occurrence, and it is only in such periods that the use of the drug as a prophylactic is imperative. Thus in temperate regions, and in the sub-tropics, for periods of from four to five months, the use of the drug as a prophylactic may be omitted with comparative safety.

The continued use of the drug in the doses recommended is not injurious in the vast majority of instances.

The development of resistant strains of plasmodia following the use of small doses of quinine, continued for a long period of time, is a question which is now receiving considerable attention. In this way are explained those cases of the disease in which the specific drug apparently does no good, and there is some evidence that such resistant strains may be so produced. If this be true, it is entirely due to improper treatment of initial cases of malarial fever, for if enough quinine be given in the beginning, and if it be continued for a sufficient length of time, such resistant strains cannot be developed. Here again we realize the great importance of the proper treatment of malarial infection. The

physician should remember that he will be responsible for much of the malaria present in the locality in which he is living if he does not thoroughly treat his malarial patients with quinine and consistently urge its use as a prophylactic in infected districts.

Quinine prophylaxis is one of the most valuable methods we possess in the fight against malaria, and the drug should be supplied by the State to those who are too poor to purchase it, as is done in Italy and Greece.

Education of the Public.—For the success of any method of prophylaxis it is essential that it receive the cordial support of the public and to this end it should be the duty of State and municipal Boards of Health to supply the people with information regarding the etiology and means of prevention of the malarial fevers. In Italy this has been accomplished by the Society for the Study of Malaria to such an extent that there is probably no one so ignorant in that country as to doubt the efficiency of the methods instituted for the suppression of the disease or who does not know why they were instituted and how they are proving successful. The example of Italy may well be followed by every State in which malaria is epidemic, for only by educating the public can we hope to fight a winning battle against these infections.

The distribution of circulars giving the necessary data in simple language; addresses, illustrated by lantern slides; the teaching of the essentials of malarial prophylaxis in the public schools, and missionary work by the physicians practicing in malarial localities are all of great value to the education of the people. In badly infected States the establishment of a commission connected with the State Board of Health, for the study of the disease and the methods which are best adapted for its control in different localities, would be a measure of great public benefit, and the methods which have been so successful in several of our States in the campaign against the hookworm could be used with as great success in the prophylaxis of the malarial fevers.

The creation of a national commission for the study of malaria, as suggested by Dr. Seale Harris, would prove of inestimable benefit to the entire country. Such a commission should be appointed for the purpose of investigating the fevers prevalent in malarial regions with a view of determining the proportion actually due to malarial infection, and the methods of prophylaxis which could be most economically and successfully employed in each endemic center of the disease. In the absence of such a commission, however, the authorities of States in which malaria is prevalent should take similar measures for its prevention. Every case of malaria should be reported to the health authorities, and they should have authority to enforce the proper precautions against its transmission, just as is done in other infectious diseases. In this way the regions of the greatest prevalence of the malarial fevers would be quickly defined and thus it would be possible to intelligently initiate prophylactic measures.

In closing, I desire to call attention to a few of the more striking instances of success attending the prophylaxis of the malarial fevers.

In Italy the work of the Society for the Study of Malaria in the prophylaxis of the disease has been followed by remarkable success. According to Celli, malaria has been gradually decreasing in Italy since the law went into effect regarding the issue of quinine by the State, the mortality of the disease having diminished almost 75 per cent, from 16,000 deaths yearly to about 4,000. Although relying mostly upon quinine prophylaxis, all other methods have been used by the society, and the result has been that immense areas have been rendered habitable which were formerly so dangerous that no one could live in them. The sale and free issue of quinine by the State, instead of being a financial failure, has been a success financially, and has resulted in the saving of the lives of thousands of its citizens. Celli claims that the issue of quinine in 1905 saved no less than 7,500 lives, and that of 59,340 persons taking daily doses of 4 centigrams, only 5.8 per cent developed ma-

laria, including both initial infections and relapses. Bettinetti, in the commune of Milan, used daily doses of the drug in 3,453 cases, of whom only 4 per cent developed malaria; while Brignoni and Algona found that by using as small a daily dose as 20 centigrams they were able to prevent infection in most instances. Thus of 80 persons who took this daily dose none developed malaria, while of 175 persons who took the same dose at irregular intervals, 13 developed the fever. Of 50 individuals who did not take any quinine, 31 developed malarial infections.

The results achieved by Colonels Gorgas and Kean, of the medical corps of the army, in ridding Havana of malaria is an excellent illustration of the efficacy of properly applied prophylactic mesures. In 1900 the number of malarial cases reported in Havana was 325. Mosquito work commenced in February, 1901, and the yearly number of cases from that time until 1910 was the following: 1901, 151; 1902, 87; 1903, 51; 1904, 44; 1905, 32; 1906, 26; 1907, 23; 1908, 19; 1909 (to July), 2.

Thus, in nine years, malaria has practically disappeared from the City of Havana, due almost entirely to the destruction of the breeding places of mosquitos.

The success attending the screening of houses has been illustrated in many regions where this measure has been carefully enforced. Procaccina, in Sardinia, reduced the number of cases of malaria among troops from 70 to 57 per cent in one season by screening the barracks, and later the percentage was reduced to less than 20 per cent. In Formosa, Tzuzuki protected 115 soldiers by screening their barracks from September to December, and not a case of malaria developed, while, for the same period of time, among 717 soldiers not so protected, there developed 251 malarial infections.

By a combination of measures for the destruction of mosquitos and quinine prophylaxis, Ismalia, a town of 6,000 inhabitants upon the Suez Canal, has been rendered entirely free from malarial infection. In 1900 there were over 2,000 cases of malaria in this town, and in 1902 prophylactic measures were first initiated. Four years afterward Ismalia was declared free from malarial infection, and Pressat claims that he was able to effect the greater part of the work, as regards the destruction of mosquitos, by a mosquito brigade of only four men.

The success of Watson and Travers, at Klang and Port Swettenham, in the Federated Malay State, is a notable example of the value of mosquito destruction. In 1901, 610 cases of malaria occurred, and mosquito work was commenced in 1902. In 1905 only 23 cases of malaria were reported in these towns, so that in three years the disease had practically disappeared.

An object lesson demonstrating the value of mosquito destruction, the protection of man from the bites of mosquitos, and quinine prophylaxis, is continually before our eyes on the Isthmus of Panama. The results which have been obtained in the prophylaxis of yellow fever and malaria by the Sanitary Department of the Isthmian Canal Commission, under the direction of Colonel Gorgas, are the most brilliant of any on record. In 1905 the number of cases of malaria admitted to hospital each month expressed as a percentage of the entire working force was 7 per cent. In 1910 this percentage had fallen to a little over 1 per cent, and it is not too much to hope that before the canal is finished malaria will have practically disappeared. Despite the fact that the force employed upon the canal has constantly increased there has been a steady decrease in the number of cases of malarial fever.

I have quoted but a few instances demonstrating that the prevention of malaria is possible even in the most badly infected localities. The cost of these measures, so frequently urged as a reason for not undertaking them is not prohibitory, as has been well shown by Gorgas. He states that the total cost of sanitation on the Isthmus for the past twelve years has averaged annually about $3.50 *per capita* for the whole population. Of this expenditure he estimates that $2.00 *per capita*

was spent upon mosquito work, and he says "this expenditure has accomplished the total eradication of yellow fever. The last case on the Isthmus occurred in Colon in May, 1906. It has reduced the deaths from malaria in the total population from a maximum of 16.21 per thousand in July, 1906, to 2.58 per thousand in December, 1909. The admission rate for employees has fallen from a maximum of 1,263 per thousand in July, 1906, to 191 per thousand in December, 1909."

We may well ask what the expenditure of $3.50 *per capita* signifies when such results can be obtained, results which have demonstrated conclusively that malaria may be banished from any locality at an expense which can be borne by the people of the region or by the State. The prophylaxis of these infections is a purely economical question, and no State can make a better investment financially than to rid itself of malarial disease. The vigorous prosecution of prophylactic methods will render malaria as rare a disease in the South as is yellow fever, and will eventually result in its total disappearance.

IS PELLAGRA A DISEASE PRIMARILY OF THE ALIMENTARY TRACT?*

By J. CLARENCE JOHNSON, M.D.,
Atlanta, Ga.

Perhaps no disease has more engaged the attention of the medical profession during the last few years than pellagra. This is certainly true in the South. The reason for this is its more common occurrence and its fatality.

In one state in 1909 account is given of 188 cases with 91 deaths. In another, it is estimated that the state loses yearly 500 to 1,000 people—a mortality slightly more than from typhoid fever.

I have found it impossible to secure complete statistics as many states have no law requiring reports of the disease. I have reason to believe, however, that the number of cases in the south has been exaggerated.

Pellagra is not confined to section or locality, and doubtless presents different features under different circumstances, but as I desire to base my study upon personal observation and experience, I will be obliged to omit a review of the subject and directly invite your attention to the matter in hand.

It is thus seen that pellagra is not found in the poorer classes alone, and that neither age, sex nor occupation predispose to it. It is not contagious and its infectious nature has not been demonstrated. A summary of the symptoms shows the following order of predominance:

1st—Eruption.
2nd—Pain.
3rd—Loss in weight.
4th—Nausea and diarrhoea.
5th—Dizziness.
6th—Cough.
7th—Vomiting and Profuse Salivation.
8th—Ocular symptoms.
9th—Miscellaneous—referred to the nervous system.

Unfortunately we cannot measure fully the importance of this classification because of the varying intensity of the symptoms, lack of knowledge as to actual time of appearance, duration and sequence. It is worthy of note just here, however, and especially to be considered later, that certain of the symptoms are always associated and appear to have significant relation to the stage of developement and course of the disease.

The symptom upon which the diagnosis is usually based is the eruption. This, in nearly

*Read before the American Gastro-Enterological Association, May 1911.

	Age	Sex	Occupation	Previous History	Duration	First Symptom	Nausea	Vomiting	Pain in Stomach	Diarrhoea	Loss in Weight	Dizziness	Cough	Profuse Saliva	Ocular Symptoms	Heart	Lungs	Liver	Kidneys	Stomach	Test Meal	Fecal Examination	Eruption
1	64	Male	Farmer	Neg.	2 mos.	Dizziness	+	+	+	+	±	+	+	+	—	NORMAL EXCEPT MYASTHENIA IN 11 AND 12				Situ	Hcl—R—		Mouth and hands
2	52	Female	Housewife	Neg.	4 mos.	Diarrhoea	—	—	±	+	—	±	+	—	—					Atony	Hcl—R+		Palms of hands
3	39	Male	Merchant	Indig'n	?	Indigestion	+	—	±	+	—	+	—	—	+					Situ	Hcl—R—		Face and hands
4	40	Male	Farmer	Neg.	2 yrs.	Pain	+	+	+	+	+	—	—	+	—					Situ	Hcl—R+		Face, hands, mouth
5	36	Male	Lawyer	Indig'n	2 mos.	Pain	—	—	+	+	—	+	—	+	—	NORMAL EXCEPT TUBERCULOSIS IN 18							
6	35	Female	Housewife	Indig'n	1 yr.	Pain	+	—	+	—	+	+	—	—	±					Situ	Hcl—R+		Hands and mouth
7	65	Male	Minister	Neg.	6 wks.	Pain	±	—	+	—	+	+	—	—	—					Situ	G+F 36 T 66		Hands
8	48	Female	Housewife	?	2 yrs.	Choking	—	—	+	+	±	±	+	—	—	NORMAL EXCEPT LARGE IN 8 AND 11				Situ	G+F 38 T 74		Hands, arms, legs
9	32	Female	Housewife	Indig'n	1 yr.	Pain	+	+	+	+	±	—	—	—	—					Ptosis	Hcl—R—		Face and hands
10	34	Female	Teacher	Neg.	1 mo.	Drawing	+	—	—	—	±	±	—	—	±					Situ	Hcl—R+	DIARRHOEA AND DYSENTERY	Hands, arms
11	36	Male	Merchant	Rheu'm	2 mos.	Nervous	+	+	+	+	—	±	—	—	+				NORMAL EXCEPT ALBUMINURIA IN 1	Atony	G+F 32 T 50		Hands
12	37	Female	Housewife	Indig'n	2 mos.	Diarrhoea	±	—	+	+	—	—	+	—	—					Situ	Hcl—R+		Hands, arms, face, mouth, body
13	51	Male	Salesman	Diarrh.	1 yr.	Eruption	+	—	±	+	±	—	+	±	—					Situ	Hcl—R+		Hands, wrist, mouth
14	34	Female	Housewife	Diarrh.	4 yrs.	Diarrhoea	—	—	+	+	+	—	+	—	+					Ptosis	Hcl—R—		Hands, arm, mouth
15	37	Female	Housewife	Indig'n	2 yrs.	Eruption	+	—	—	+	+	—	+	—	—					Situ	G+F 30 T 33		Hands, wrists
16	32	Female	None	Indig'n	3 mos.	Eruption	—	—	±	—	+	—	—	—	—					Ptosis	G+F 24 T 42		Hands, mouth
17	26	Female	Housewife	?	6 mos.	Sore Mouth	+	—	+	+	—	+	+	—	+					Atony	G—F 18—T 38		Hands, mouth
18	28	Female	Housewife	T. B.	?	?	+	+	+	+	—	+	+	—	—					Atony	Hcl—R+		Hands, mouth
19	47	Male	Merchant	Neg.	8 mos.	Indigestion	+	+	+	+	+	—	+	+	—					Atony	Hcl—R—		Hands, mouth
20	52	Female	Housewife	Indig'n	1 yr.	Diarrhoea	+	+	+	+	+	—	+	+	—					Situ	Hcl—R—		Hands, arms, mouth
																				Ptosis	Hcl—R—		Hands

all cases, appears on the dorsal surface of the hands, and forearm, beginning at the base of the first phalanx and extending half way to the elbow or entirely so. I have seen a few cases in which the eruption was confined to the palmar surface of the hand in the form of blackened fissures. On the leg it begins at the ankle and extends half way to the knee. The eruption is symmetrical with well defined borders, varying from simple redness to blebs and erosions, leaving, when it disappears, a smooth velvety skin. When there is no distinct eruption, there is often a deposit of brownish looking pigment. This, as well as the typical dermatitis, sometimes develops in the face, chiefly on the forehead and cheeks. In some cases there is found on the tongue, gums and pharynx a membranous deposit with inflamed base not unlike that found in measles and diphtheria. Accompanying the eruption there is often intense itching, or burning, which may occur in any part of the body. During the winter the eruption grows markedly less, but never entirely disappears. The following spring it assumes its usual characteristics, being more or less severe.

Rivaling the eruption in frequency and considered no less important as pathognomic are the various phenomena ascribed to the nervous system, among these dizziness stands first. In many there is weakness, despondency, loss of memory, numbness of extremities, aching in different parts of the body, especially about the neck and shoulders, and usually only in one shoulder, in the same individual. One particularly complained of constant aching above the sternum. The movements are sluggish and uncertain. The expression of the face so characteristic that I would term it *facies dolorosis*, the attitude that of one who looks upon the abomination of desolation. In some insanity supervenes. Except in one case reflexes were normal. In that one the patellar was exaggerated.

Our summary shows that twelve of the patients suffered much from dizziness. In none was there actual vertigo. The visual disturbance consisted of heaviness, or aching about the eyes, difficulty in reading or writing—muscae volitantes.

Cough deserves attention only in that except in case 18, which had T. B., there was an absence of all objective symptoms. Several of those who had no cough had profuse discharge of ropy saliva, notwithstanding there was a noticeable absence of mucus in the stomach. With two exceptions, 4 and 6, those who had choking had neither cough nor ropy saliva.

In case 11 there was albuminuria due to other causes than pellagra.

Except in one patient who had marked indicanuria, there was nothing discovered in the urine nor in the action of the kidneys which could be called pathognomonic or pathological.

Analysis of the blood has thrown no light upon the nature of the disease. I regret that I cannot submit a more complete report of investigation along this line. It has been said that fractures heal slowly in pellagrins. I tailed to find a lack of fibrin elements. Case 4 a few nights after admission jumped from a second story window to a brick pavement below, sustaining a compound fracture of one leg and concussion of the spine. Recovery was prompt and without incident.

The circulation is usually feeble, yet blood pressure readings have been practically negative. There is, however, in the later stages of the disease a tendency of myasthenia cardia. In fact, the immediate cause of death in the fatal cases here recorded has apparently been asthenia cardia—death being rather sudden.

Fifteen of the patients had nausea, 7 vomiting, 17 pain, 15 diarrhoea, 4 had marked gastroptosis, 6 atony. In 14 there was an absence of Hcl, in 2 it was reduced. In 7 there was no rennin, 7 had sore mouth.

The pain here alluded to was referred to the stomach, of a colicky, cramping nature, occurring at indefinite times. The nausea and vomiting was as a rule following meals.

The duration of the disease is as uncertain as its history, and is not determined by nor does it determine the presence or absence, time

of appearance or association of any symptoms. Usually a definite history is hard to obtain. Many do not consult a physician until alarmed by the appearance of the eruption, or else the eruption being late to appear, are treated for other supposed disorders. Case 14 died four years after recognition of first symptom, diarrhoea. Case 11 lived only two months.

Now let us adjudge if possible the relative competency of these various symptoms as pathognomonic of the disease.

The eruption is so distinct from other forms of dermatitis that its morbid process cannot be mistaken and that it is a clue to the complex nature of the disease seems certain. Its seasonal recurrence suggests a kinship to poisoning by such vegetable substances as ivy, etc., but this relation is too strained to be of value in our study. The appearance of the eruption in the mouth and throat also suggests a kinship to diphtheria, measles and scarlet fever. Yet if it were maintained that pellagara is a disease of special toxemia, it remains to be explained why in the former there is fever—albuminuria—a definite history and short duration—whereas in the latter the contrary is true—especially the absence of fever as we have seen in only one case was there albumen in the urine, and in only one fever, both of which were due to other and independent coditions.

The eruption is aggravated by rays of the sun. I know of no effect from artificial heat. The eruption does not seem to bear either causative or sequential relation to the state of the nervous system. Insanity has developed after the eruption has disappeared and in some cases the nervous symptoms are pronounced before any evidence of eruption. In fact, neither the form or degree of nervous disorder is determined by the presence or absence of any other symptoms. Two of the fatal cases showed no signs of insanity, whereas case 11, of shortest duration, the most vigorous of all the patients, was so violent that he had to be put in a straight jacket. He died two months after appearance of first symptom, and three days after admission to the sanitarium.

Another fatal case, not included in the tabulation, was perfectly rational until death. Case 7 presented a most typical eruption but was always cheerful. In each case where insanity has developed the patient has died.

The sensory and motor symptoms such as weakness, numbness, aching, can be explained by the state of nutrition incident to digestive disorders. Of the patients who complained of dizziness, four had ocular symptoms. Of these four, two had some form of astigmatism. Eight of those with dizziness had no Hcl. The two who had Hcl with dizziness were those with astigmatism. In none of those who had dizziness with or without the use of glasses was the eruption so typical as in case 7, who, though an old man, had no dizziness and wore glasses only for incidental reasons.

Only one of the fatal cases complained of dizziness and this one had no Hcl.

Disturbance of vision is a common accompaniment of gastro-intestinal diseases. The oldest and one of the most severe cases complanied of no trouble with his eyes, nor any definite form of nervous trouble except dizziness, yet the eruption was typical on hands and very severe in the mouth. He had pain, vomiting, profuse diarrhoea, marked prostration, frothy saliva. There was a total absence of gastric juice.

One of the youngest, who had very slight eruption on hands and forehead, was troubled much with dizziness and ocular symptoms without astigmatism. Diarrhoea was persistent. He had no gastric juice. In only one patient was there visual disturbance in the presence of Hcl who did not wear glasses, and she was a teacher. Of course, only a routine examination of the eye by a specialist could eliminate all doubt as to the significance of this feature of the disease.

Having thus sifted and weighed other evidence, let us examine more closely the alimentary symptoms and conditions. Only six of the twenty had free acid. In this six, with one exception, the eruption was slight. In the exception the eruption was severe and he also had the highest acidity and the least nervous

disturbance. In fourteen cases lacking Hcl, diarrhoea was present. In the eight cases with absence of Hcl, but presence of rennin, the diarrhoea was less frequent, less severe and less persistent. In no patient with Hcl was there diarrhoea, except one, due to transient cause.

The membranous deposit in the mouth, with one exception, was present only in those lacking Hcl.

In the patients with atony and ptosis, three had Hcl, two had rennin without Hcl.

Case 4, one of longest duration, had the most severe eruption on the hands and face and in the mouth; had rennin, but no Hcl. Of the four who died, only one had rennin. No patient who had Hcl has died nor become insane.

The question may now be asked, is pellagra a disease primarily of the alimentary tract?

The first recognizable symptom in fourteen was directly referred to the alimentary tract. In only three was sore hands the first symptom, and in each of these was there a previous history of indigestion in some form.

Case 3 was treated for diarrhoea two years before appearance of eruption. There was no Hcl on first examination.

Case 4 had suffered for two years with dull pain in stomach. Case 8 was treated for gastroptosis, pain, choking and other symptoms two years before appearance of eruption, during which time, there was absence of Hcl. This case is notable for the fact that it proved fatal.

Case 9 is also remarkable in that when first seen in 1907, the eruption on hands was severe. Hcl was then present. Prior to this she had much pain in stomach. Following treatment rash disappeared and other symptoms were hardly noticeable. She gained 40 pounds and later gave birth to a healthy child. Last summer the eruption returned. Hcl was absent. Without question the absence of Hcl is an important feature of the disease—not essential to its development, not determining its course, but significant of its gravity and prognostic of its results.

In each fatal case vomiting and diarrhoea played the most important role in the last act of the tragedy, for tragedy it may be fitly called. It is obvious also that the eruption has nothing to do with the appearance of gastric symptoms, nor in the production of insanity. In fact, in each of the fatal cases, except one, the eruption had disappeared. It is easily apparent too that the involvement of the nervous system is not causative of the disorder of the digestive organs. The pathogenesis of the disease must yet remain in some doubt. We cannot enter fully into a discussion of this here.

It is certain, however, that season has to do with its occurrence and recurrence, and changes in diet, clothing, habits, etc., incident to season are worthy of consideration in a further study. Climatic conditions may have much or little influence upon it. Eleven of the twenty cases were from the northern portion of our state, which is mountainous. Of the remainder, some were from Southern Georgia, and others from various parts of South Carolina and Alabama. Five ot the eleven from Northern Georgia were residents of Atlanta. Only two were exurbans.

There are no sandflies in Atlanta, and some of the patients had eaten sparingly, or not at all, of corn bread. But in some who had used it freely, there was a distinct craving for it when it was withdrawn and symptoms appeared to be aggravated by its resumption.

No micro-organisms of pathological importance were found. So we turn again to the alimentary tract for direction.

The disease is distinctly one of perverted metabolism, having its first expression in the epithelial structures of the alimentary tract. Time does not permit a proof or demonstration of this fact, nor even allow us to follow the modus operandi of its production. The authority for the statement rests upon the competent evidence which the cases themselves have presented. Other than this would be presumptive.

The treatment of pellagra is not a part or this paper, and would hardly be permissable

did not results add some degree of confirmation to the theory of its pathology. With this license the following report of cases is given. In each of these the prognosis appeared most grave:

Case 1—Sixteen stools daily, eruption typical on hands and in mouth. All symptoms accounted in table present. Four days after beginning treatment, one or two stools daily, other symptoms subsiding pari passu. Four weeks later had gained twenty pounds.

Case 4—Eruption most severe on hands, face and in mouth—face and hands oedematous—tongue could not protrude because of swelling. End of third week, patient's appearance practically normal, condition good.

Case 18—Tuberculosis complicating, eruption typical on hands and in mouth. Temperature 102, much prostration, pain in stomach, nausea, vomiting, diarrhoea all present. Three weeks later, no eruption. Temperature normal, T. B. absent, other symptoms having also disappeared. One month later had gained several pounds in weight.

Similar results have been realized in other cases of equal gravity, not here recorded. In all there is evidence of improvement within 48 to 64 hours. Since beginning this plan of treatment not one has died.

A prescription is given containing Potassium Chlorate, Tr. Chloride of Iron with Ess. of Pepsin, also a pill of Cal. Sulphide.

The frequency of dose is governed by the indications of each case.

The diet is milk and egg.

ADDENDUM.

For lack of time and privilege allowed by the title and purpose of this paper, details of treatment were omitted. I therefore desire to supplement what is said above, hoping that those interested in the subject, as we all must be, will see fit to demonstrate by trial the truth or fallacy of the apparent facts.

The summing up of the evidence is correct and the evidence itself is indisputable. Further observation and experience only strengthen it.

At some later date the writer hopes to elaborate the physiological features of the study and offer some explanation of the manner in which the cause operates in producing the unusual conditions and train of symptoms characteristic of the disease. Of course, the stage in which the disease presents itself, the chemical condition of the alimentary tract, the presence of complications, etc., determine the details of treatment.

For example, if the motility of the stomach is diminished, with or without ptosis, special attention must be given to relieving as rapidly as possible the myasthenia, by diet, electricity and general conduct.

The patient may not be confined to bed. In such a case with ptosis a suitable support is supplied and fluids restricted.

If at the same time, or in the absence of the above conditions, there is hyperchlohydria, alkalies, such as sodium bicarb and magnes ust. are given.

When diarrhoea is severe, for the first day or two, bismuth, calcium carbonate, tannigen, may be needed, but not often.

In ambulatory cases, not severe, an ordinary light diet is allowed. In all cases at the very beginning, the drugs named above are administered and continuously used until symptoms have disappeared. Nothing is needed for the eruption.

The exact prescriptions used are as follows:

R. Potassium Chlorate.....drams ii ss.
Tr. Ferri Chlor.....drams iv
Ess. Pepsin q. s.....ounces vi
M. Sig. Drams ii in wine glass of water through a quill, after meals.

R. Calc. Sulphide, tabs. gr. ss...L. (Abbott.)
Sig. One three times daily.
In severe cases these doses may be given a little oftener.

Even in the severe cases olive oil, given in small doses, alone, or combined with raw egg will control the cramp or pain. This failing, paregoric may be given.

It is very necessary to keep the patient under constant and continued observation, to ad-

here strictly to details in the treatment, until relief comes. Otherwise, satisfactory results will not follow.

Since the above article was presented several of those reported have been seen and there is no recurrence of the trouble.

THE ETIOLOGY AND TREATMENT OF PELLAGRA

By GILMAN J. WINTHROP, M.D., and H. P. COLE, M.D.,
Mobile, Ala.

The rather widespread incidence of pellagra in this country and the high mortality rate so far noted warrant a resume of the theories of etiology and treatment of the disease.

The increasing number of cases reported by the general practitioner demands a more widespread knowledge of pellagra and a more thorough understanding of its treatment.

While the cause of pellagra is still undetermined the amount of excellent work which is being devoted to its study promises early results. The present theories of etiology may be catalogued as follows:

A. That corn is lacking in nutritive properties and that its use, as a chief component of diet, results in insufficient nourishment. The facts that corn is, in reality, rich in fats and nitrogenous substances, is easily digested and absorbed; that pellagra occurs where corn is but an incidental article of diet; and that inanition seems to be a result rather than a cause would negate this theory.

B. Lombroso's "verdet" theory, which holds that the growth of certain fungi, penicilli and aspergilli produce chemical changes in corn with the formation of toxico-chemical substances. The ingestion of this toxin bearing corn produces pellagra.

C. The toxico-infective idea that spoiled maize after its ingestion forms endogenous toxins. This toxin formation being due to the chemical action produced by bacteria (B. maidis, B. Coli, etc.). This view would place pellagra among the auto-intoxications.

D. The infectious theory. This claims that pellagra is a specific infection of bacterial or mould origin.

Ceni believes that two fungi-Aspergillus fumigatus and flavescens—are the cause of pellagra. He states that one, rarely both, of these fungi gains entrance to the intestinal canal in corn or rarely on other foodstuffs.

In the intestines the fungi produce an inflammatory condition with the elaboration of toxins, which being absorbed give rise to a general intoxication. Spores formed by the fungi, also, pass through the intestinal wall and may produce an aspergillosis in the lungs, pleurae, pericardium, etc., and to this he attributes the fatal termination. He further demonstrates that the seasonal occurrence of pellagra accords with the time of greatest biologic activity and virulence of the fungi. The fungi are quite resistant to heat and are not killed by ordinary cooking temperatures. Ceni's work is very suggestive and seemingly explains many of the phenomena of pellagra. It has not, as yet, been verified by other workers.

Tizzoni, also, classifies pellagra as a toxico-parasitic disease but considers it due to the "Strepto-bacillus pellagrae." This organism he claims to have isolated from the blood, tissues and stools of pellagrins and also from decayed maize. By feeding animals with the bacteria with corn he claims to have produced typical pellagrous symptoms. The toxins of the bacteria show a marked affinity for nerve tissue and to a less extent for the liver and kidneys.

Tizzoni's Strepto-bacillus has not been isolated by other workers, nor have his experiments been verified.

E. Sambon's protozoon theory. In 1905 Sambon called attention to the similarity of pellagra to certain protozoon diseases—syphilis, trypanosomiasis, kala azar, etc., and sug-

gested that pellagra might be of protozoal origin. After researches in Italy Sambon concludes that corn bears no relation to pellagra; that pellagra is caused by protozoon; and that a fly—Simulium reptans—acts as an immediate host for the protozoon organism. He states that Simulium has the topographical and seasonal distribution of pellagra; produces epizootics in animals in America and Europe; and finally that Mesnil has discovered a protozoon organism in Simulium.

F. Finally there is the school of "antizeists," who deny that pellagra is a definite disease and regard it as merely a symptom complex noted in insane, alcoholic and other depressed states.

These various and conflicting ideas of etiology permit, as yet, of no precise conclusions. Lavinder and Babcock sum up the theories as follows: "It may be said that while the real nature and cause of pellagra still remain in doubt, there is, nevertheless, a firm and almost universal belief that the disease is in some way connected with the use of corn as as article of food—a belief so universal as to render its rejection well nigh impossible except in the face of demonstrative proof to the contrary. Ceni's work and ideas, in the present state of our knowledge, have attracted great attention and in their light many obscure points seem to have received illumination but they still await confirmation. Tizzoni's specific bacillus must yet stand the test of time. Sambon's idea rests only on an argument by analogy and is at present little more than a suggestion, but a highly interesting one. It may possibly lead to important developments at the hands of investigators."

PROGNOSIS.

Statistics as to the mortality rate in pellagra in this country are not only meager, but chiefly based on hospital and asylum records. More exact data of cases treated in private practice is much to be desired.

The average Italian mortality of about 10 per cent. is much below that of the United States. A death rate of 35 to 65 per cent. noted in asylum cases, is, we believe, none too low for the cases treated at home throughout the southern states.

Our high mortality is to be accounted for not alone by the greater severity of the cases, but also by our delay in diagnosis and tardiness in treatment. The rapidly developing typhoid cases are generally considered hopeless and those with marked psychic and nervous symptoms offer a severe prognosis to the general therapeutic measures.

Among unfavorable prognostic signs may be mentioned fever, extensive moist dermatitis, mental involvement, progressive emaciation and persistent nausea. Myocarditis, especially if occurring early in the disease, we consider of especial danger.

TREATMENT.

The treatment of pellagra may be discussed under the following headings—General Measures; Dietary; Hydrotherapeutic; Medicinal; and Surgical.

General Measures.—Hospital care and efficient nursing are, we believe, most important factors as they assure rigid enforcement of all therapeutic measures. Cleanliness and fresh air are most important. Patients showing marked symptoms should be confined to bed, especially is this essential in the presence of fever. Cases in the subacute stage and those showing improvement are benefitted by a moderate amount of exercise which aids digestion and elimination and promotes sleep. Patients should be protected from the direct rays of the sun, but fresh air is always a desideratum. Change of climate undoubtedly improves many cases and is probably beneficial in preventing relapse.

Dietary.—Conservation of the patient's strength and the necessity of combatting a chronic intoxication demand a more nutritious and extensive diet than is generally given. Diarrhoea, tympanites and gastric disturbances are not of inflammatory origin but trophic—part of a general intoxication—and do not contraindicate food. Persistent vomiting, being due largely to hypersecretion, will persist without food and is often relieved by

the ingestion of small amounts, frequently repeated, of liquid or semi-solid nourishment.

Egg albumin, milk, buttermilk, koumiss and broths are the most nutritious and palatable foods. Nourishment should be given in small amounts every two or three hours in severe cases. A more solid diet should be tried early, the fluid foods being continued along with it. Microscopic examination of the feces will aid in determining the efficiency of the digestive apparatus.

A steady gain in weight is a most encouraging sign and, especially in transfused cases, we base the porgnosis largely on the ability to retain food and the gain in weight after operation.

Preparations of corn should be avoided until its etiological relation to pellagra is disproved.

Hydrotherapeutic Measures. — Hydrotherapy is much lauded by the Italians and is distinctly beneficial in the treatment of hospital cases. Baths, especially warm, aid in elimination, increase muscle tonus and have a general tonic effect. Mental symptoms frequently yield to hydrotherapeutic measures more readily and safely than to drug therapy. Massage is excellent especially during convalescence. We have had no experience with the "salt baths" advised by the Italians.

Medicinal.—The long list of drugs and preparations suggested for use in pellagra is but an index of the inefficiency of most of them. The uncertainty of etiology makes rational therapy impossible and our treatment must be largely symptomatic.

The application of medicines to the treatment of pellagra had best be considered under the special symptoms.

Anaemia.—Iron preparations are objected to by some on the ground that they increase intestinal symptoms and may produce a stubborn constipation. We have used the Blaud's Pill or Tinct. ferri Chloridi as a routine, have noted no such complications from their use and regard them as distinctly beneficial for the anaemia. The various haemoglobin preparations have proven unsatisfactory.

Excitement and Sleeplessness.—These are troublesome compliiations especially in bedridden patients. Warm baths and massage are often most efficacious in their relief. The hypnotics, chloral, paraldehyde, trional, etc., are excellent, but their long continued use is to be deprecated.

Dermatitis.—Unless moist and ulcerating the skin eruptions had best be let alone. Eroded areas should be protected and infection prevented by the use of mild antiseptics. Mild bichloride of mercury boric acid on picric acid solutions we have found most serviceable.

The burning often complained of, especially at onset of eruption, often yields to a dressing of zinc oxide ointment. Frequent bathing with a non-irritating soap and warm water will prove helpful in removing dried scales and will often relieve the itching.

Diarrhoea.—While often a most harassing symptom too much importance is usually given to it. Attention has been called to the fact that the checking of diarrhoea may precipitate graver symptoms and it is suggested that by the diarrhoea the system purges itself of toxins. Diarrheoa, we believe, is to be preferred to an obstinate constipation.

The bismuth salts (subnitrate, subgallate or salicylate) in large doses, especially with salol are usually sufficient to check diarrhoea. A preliminary purging with calomel, followed by a saline, is to be recommended before giving the bismuth and salol. Enemata of cold water are advised by some. Opium preparations should be used only as a last resort.

Arsenic Preparations.—The use of arsenic, as an antidote for pellagrous poisons and more lately as a specific against the supposed protozoon infection, has elicited most varying reports. Fowler's solution has proven useless in our hands except for some possible effect on the anæmia.

The newer preparations, atoxyl, soamin (sodium arsanilite) and arsacetin (an acetyl derivative of atoxyl) have hardly fulfilled the hopes with which they were at first received. These preparations are claimed to be less toxic and irritating and to liberate arsenic slowly into the system. Hypodermic or intramuscular

administration is best as by mouth gastric symptoms may result. We have used chiefly atoxyl, giving one to three grains every second day for ten to fourteen days, then stopping its use for an equal time and again giving the drug. While doubting any specific action of atoxyl it certainly benefits some cases and we can advise its use. We have noted no toxic symptoms from its use.

Babes reports excellent results from the combined use of atoxyl and arsenic trioxide given as follows: Atoxyl 0.5 gram hypodermatically; 5. gram arsenic trioxide ointment (1 to 50) rubbed into the skin; and internally a pill of arsenic trioxide (.001 to .002 grams) three times a day; this treatment is given on two successive days and if necessary repeated once after an interval of one week. We have had no experience with this treatment.

Of general remedies, strychnine and especially nux vomica has proven good as a general tonic and cardiac stimulant; Hexamethylenamine is to be advised in many cases, especially with coexistent cystitis. Salvarsan has of late been rather extensively used in pellagra. The results obtained would hardly justify its further use.

Surgical.—The surgical measures employed in treating pellagra consist in the administration of serum from recovered pellagrins and in the transfusion of blood.

The application of serum-therapy and direct transfusion of blood are based on the premises that pellagra is an intoxication and that antitoxic pellagrous bodies are formed in vivo. The specificity of the pellagrous toxins and the possibility of antitoxin formation cannot, at present, receive a categorical answer, there is, however, considerable evidence in favor of such a belief.

Babes and others have demonstrated the presence in pellagrous blood of substances which are antagonistic or antidotal to extracts of spoiled maize. These antagonistic bodies are probably of an antitoxic nature.

Tizzoni claims to have produced typical pellagrous manifestations by the injection of pellagrous blood into animals.

Antonini and Gatti have demonstrated distinct precipitative properties in pellagrous blood and found its haemolytic action much above normal. D'Ormea, likewise, concludes that pellagrous blood contains specific antibodies.

Antonini and Marianni claim cures in several cases of pellagra following the use of serum from recovered typhoid pellagrins. Lombroso also believed that such serum was of undoubted value in the treatment of pellagra.

The hope of combatting the severe anæmia and perhaps of transferring specific antibodies prompted the use of direct blood transfusion in pellagra and the results noted in the first case encouraged its further trial. The results obtained in transfusion are briefly noted below.

Transfusion has been resorted to only in those cases resisting long and competent medical treatment.

All of the transfused cases have shown well marked pellagrous symptoms, have been of a most severe type and in the terminal stages of the disease. The mortality in these cases, under medical treatment, would have probably reached 80 to 90 per cent. Thirty-one cases have been operated on with 18 recoveries (59 per cent.), or a case mortality of 42 per cent. Considering that two of the fatal cases were hopeless at time of operation and all of a most severe type, we consider the mortality rate as low.

Cases going on to recovery show an improvement in the symptoms within a few days after operation and an almost immediate and steady gain in weight.

We have used recovered pellagrins as donors in three cases; non-pellagrous relatives in 16 cases and non-relatives who had never had pellagra in 12 cases. Our statistics would show that the choice of relatives as donors has no advantage over non-relatives.

We believe that an earlier resort to transfusion would give decidedly better results. The operation is practically without danger in experienced hands and in none of the fatal

cases could the termination be attributed to the operation.

CONCLUSIONS.

(1.) The etiology of pellagra is as yet undetermined and a truly scientific therapy is at present impossible.

(2.) Medical treatment will result in cure in a large proportion of the mild cases.

(3.) Transfusion is offered as a surgical procedure in the cases of pellagra resisting medical therapy. A marked lowering of the mortality rate has, we believe, followed its use in these severe cases.

202-204 *Conti St.*

CHINESE MEDICINE.

By ADRIAN S. TAYLOR, M.D.,
Yangchow Baptist Hospital,
Yangchow, China.

Fact and fiction about China and things Chinese are strangely interwoven, so therefore, to be able to write a truthful report about the drugs used at the present time by the native practitioner, I gave an old friend of ours, who was a doctor himself in his youth, a sum equivalent to forty-five cents in our money, and asked him to buy from a drug store for me, its worth in standard remedies used at the present time by the native doctors in every day practice. Should any be especially dear, I requested him to borrow them from the apothecary for my inspection, promising him that they would be promptly and safely returned. The next day he came to me with a basket well filled with various and sundry remedies. He was able to purchase outright a hundred packages of different kinds of drugs, and a great many different kinds of pills, ranging in size from a duck shot to a marble. I was informed that the small pills were bought and taken by the ounce, while the large ones were purchased by the piece. I have several of the larger pills before me as I write. One lying on my desk before me is inclosed in a pretty little yellow box about one cubic inch in size. Inside this box there is a beautifully made white wax capsule one inch in diameter, with the name of the pill and of the shop stamped on it in red characters. On breaking open this capsule, I find a pill inside one-half inch in diameter, wrapped in Japanese lens paper. This pill is so hard that it takes nearly all my strength to break it open by throwing it down on a cement floor. There is another large black pill, a full inch in diameter, and which weighs more than ten grams, that is used for various diseases and diseased conditions named in the circular furnished by the druggist. The doctor did not know what the pill contained, but he took the manufacturer's word for its usefulness in the affections printed on the label. How like the good old days of the proprietaries at home before the Council began its work of cleaning house!

My old friend was able to borrow several specimens that were quite interesting from a Western standpoint. There were pieces of foreign, Korean, and Manchurian ginseng. Some of the best specimens are far more expensive than gold by weight. The value in the mind of the Chinese depends a great deal on the shape of the root. A root taking the form of the human figure will bring almost a fabulous price. This useless drug is used by the Chinese as a tonic. The operation that started off our surgical work was for hernia in an old Buddist priest. During his convalescence he kept a piece of ginseng in his tea cup all the time, and I suppose he attributes some of the good health that he has since had to its magic virtues.

There was also an old, decayed tiger bone, retailing for $2.00 that was to be used in making "infusion of Tiger Bone," a remedy famed

for weak bones and tendons. There was a fine piece of cinnamon bark, that was said to be good for impotence. For this trouble, there were two other sovereign remedies. These were two dried penes, each a yard or more long, one taken from a tiger, and the other from a deer. I was assured that the rat-tooth like projections on one specimen, were peculiar to feline penes, and were a proof of genuineness. This remedy is taken as an infusion. The doctor gives a prescription for the dried organ which is bought by the patient from the shop, and is taken home to be steeped in cold water for the required length of time. This is a remedy par excellence for old men who have not been blessed with descendants, but it is available for the rich only as each penis retails for about six dollars.

There is a common saying among the people on the street that human placenta makes a good remedy for tuberculosis, and I was assured that the shops stock this animal product both moist and dry. The moist organs are kept in jars, and the dry form is made by powdering the organ after thoroughly drying before a fire. Human fetal skull bones are also kept on hand for the same disease. My friend thought these specimens too dirty to bring for my inspection.

On any walk through a Chinese city, one can see the remains of many doses of medicine lying here and there, especially at the cross roads. Practically all the drugs of the Chinese Pharmacopoeia are administered in the form of a decoction, and the patient thinks that if he places the dregs where they will be scattered by every passerby, that he will not have to take another dose. The reason for this opinion seems to be that they think that in spite of the prolonged boiling in making the decoction, that there are virtues still unextracted from the crude drugs, and by scattering these to the four winds, they will get merit for this good deed.

The Chinese take a lot of stuff down in the form of their favorite hot decoctions. A patient goes to a doctor, states his troubles, has both pulses felt, and separately diagnosed, and is given a prescription that calls for from ten to twenty different crude drugs which he is to buy at the shop in the quantities indicated in the prescription. He is to take the half pound or so of stuff home, and cook it up into the dose that he is expected to take. I examined a hundred or so specimens of drugs ordinarily used, and found that they have a fondness for the sliced roots and rhizomes of their native plants. They do, however, use all parts of the plants as we do in the West. I should say that from a pint to a quart of the decoction would be taken at one time, and always piping hot. Many drugs are famed as diaphoretics, but their hot tea is also a good one, especially in the middle of a China summer.

I looked up the botanical names of a number of the drugs that are commonly used, and was surprised to find so many that are also official in our Pharmacopoeia. Among these I noticed gentian, cardamon, cinnamon, orange skin, cimicifuga, ginger, and digitalis. They seem to have no idea of trying to find the physiological action of a drug as we do; for instance, they use the root of digitalis as a diuretic, for nocturnal emissions, for deafness, for fever, for dry coughs, and to make the hair turn black.

In China one sees hundreds of people maltreated by self styled doctors who have no understanding of the fundamentals and elementary facts of anatomy, physiology, or therapeutics; whose eyes are blind to all that nature has to teach one who can see; and whose ears are deaf to all voices save those of the sages of pre-historic times. The old style doctor knows nothing of an intelligent empiricism that should have raised their practice to a higher plane during all the ages that this nation has enjoyed the forms of civilized life.

There is a movement on foot to establish for China several thoroughly equipped and well manned medical schools. One is already doing good work in Peking, where it has the help of the physicians connected with the several legations, as well as of those furnished by the various missions at work in the North. One has gotten a start in the South at Canton

under the auspices of the University of Pennsylvania. One is planned for the far West, and one is just now opening its doors at Nanking for the East Central portion of the Empire. The day of man's inhumanity to man is fast drawing to its close, and it is the hope of the writer of these lines that the medical profession of our dear Southland will take a real part in extending to this poor land of China some of the benefits of our abundant Western life.

PRESENT STATUS OF THE HOOKWORM CAMPAIGN IN ALABAMA.*

By WM. W. DINSMORE, M.D.,
Montgomery, Ala.

The title of this paper comprehends a much larger subject than can be elaborated in the time allotted. Only the more important features of the work, therefore, have been considered, leaving many very interesting facts and figures to be set out in a future paper.

Under the auspices of the Rockefeller Sanitary Commission and the State Board of Health of Alabama, this important work was begun in October of last year. The State Director, State Health Officer and three field men, Drs. H. G. Perry, J. Fraser Orr and W. W. Perdue, constitute the force at present actively engaged in carrying on the work. It will be of interest to note here, the personnel of the Rockefeller Sanitary Commission, surely an inspiring body of public spirited men who are identified with various scientific educational interests. The Chairman is Mr. F. T. Gates of New York, also Chairman of the General Educational Board; J. Y. Joyner of North Carolina, and Starr J. Murphy of New York, likewise members of the same board; Edward A. Alderman, President of the University of Virginia; D. F. Houston, Chancellor of Washington University of St. Louis; P. P. Claxton, of University of Tennessee and H. B. Frissell, of Hampton Institute, Hampton, Virginia; Walter Page, Editor of World's Work; John D. Rockefeller, Jr.; William H. Welch, of Johns Hopkins University; Simon Flexner, of the Rockefeller Institute for Medical Research, New York; Ch. Wardell Stiles, of United States Public Health and Marine Hospital Service, and Wickliffe Rose, of Washington, formerly of Peabody University of Nashville. All these men are continuously lending their help and influence in the furtherance of our work, and indeed, without them, it would be an impossible task.

In the discussion following these remarks, the field men will likely relate more of the details of field operations and tell something of the problems they have encountered and it is my purpose merely to outline as briefly as possible, the organization of the work and to deal in a general way with the modus operandi governing the steps which we have taken thus far in our efforts to bring this great educational question properly before the laity, also the medical profession, upon whom rests a large responsibility for ultimate success.

Obviously, to wage a campaign in Sanitary and Preventive Medicine, such as this one is, which is to become State-wide in its scope and has for its chief object, the eradication of a malady which exists and spreads because of *Soil Pollution* by hundreds of thousands of sufferers infected with an intestinal parasite, would seem to be a tremendous undertaking. So it is. It is a reform movement and means that our people must revolutionize some of their habits of unsanitary living. They must be educated. They must be taught how to construct and properly care for a modern sanitary privy. They must, in some respects at least, learn to take lessons from the customs of the feline family.

*Read before the Medical Association of the State of Alabama, Montgomery, April 19-22, 1911.

Those of us directly engaged in the work feel that success is already assured, for the results already obtained in so short a time, fully justify great expectations for the future.

The general scheme of operation has been to develop three definite lines of work. First, to determine the geographical distribution of Hookworm Disease in Alabama; secondly, to devise ways and means of bringing the sufferers to treatment, and thirdly, to outline plans for a permanent sanitary survey.

Several months before our organized work was begun, a preliminary canvass of the State had already been made by Dr. Perry under the direction of the State Board of Health. This earlier work demonstrated the wide distribution of the disease and a summary of his report coupled with the findings of Cole and Winthrop of Mobile, McCafferty of Mt. Vernon Hospital and Lanford of Tuscaloosa, showed that the infection existed in 63 of the 67 counties. It had been further determined by Stiles, also by the above named observers, that the disease was more prevalent in the southern counties than elsewhere. It was decided, therefore, to inaugurate the campaign in this section of the State, as on account of the heavy infection that existed here, it would afford a rich field to show early results of our methods of attacking the problem to be worked out. Having persued this plan, the campaign has been carried into the five counties of Houston, Geneva, Coffee, Dale and Covington. Without going into detail regarding the proposed plan which underlies our method to eventually reach the entire State, suffice it to say that as the work progresses, socalled sanitary districts will be mapped out, designated by number, each district to comprise from four to eight counties, depending upon the degree of infection found, therefore, the volume of work to be done in a given district. One field man is to be assigned to each sanitary district and will make a thorough campaign through every important point in the counties under his supervision.

Realizing, that in order to make this work of value and to accomplish its real purpose in a given community, we have exerted every effort to put the campaign upon a permanent working basis. The county, therefore, was adopted as the unit of organization and of work. The already existing agencies in a county, the established institutions of the community were naturally selected as the proper media through which to approach the problems to be solved. We have therefore, everywhere, enlisted the co-operation of these four fundamental agencies, namely, each county's own system of public health, its own system of organized medicine, its own organized public press and its own system of public schools. In addition to these we have received invaluable aid from other important sources, such as County Courts of Commissioners, municipal officers, various charity organizations, and in numerous other instances, public spirited citizens have given valued service to our field men.

Our first step everywhere in carrying the campaign into a given county, is, invariably, to lay the whole plan before the medical profession of that county. It is quite obvious, that it is imperative for us to have the hearty endorsement and co-operation of the local physicians. Without this, it would be a serious matter of course for us to enter their territory with appeals to their patients, who, in the very nature of things, feel responsible, first of all, to their own family physician. In this connection, it is very gratifying indeed to be able to say that in every instance, our county medical societies as a whole, have always extended their help and assistance, and as organized bodies, have gone on record as heartily endorsing this educational work. With but very few exceptions, the doctors as individuals, have done even more in that many of them have taken an active lead in the work. The exceptions of course are to be regretted. In one or two instances we have encountered physicians who opposed this humanitarian cause, seemingly regarding such work as a trespass on their individual rights—an outside interference which would deprive them of revenue. Time does not permit an argument

on this point, though it may be safely stated that such is not true.

After succeeding in enlisting the help of our own profession, such an influence spreads rapidly, and it is an easy matter then to appeal to the other agencies mentioned, particularly, the public schools and the public press.

Having begun our work in the early Fall, it was obvious from the outset that the public schools, at this season, just opening up throughout the counties, would prove an invaluable asset in our work, inasmuch as they were of easy access, and through such a medium we could reach directly the largest number of individuals of school age—the very ones so vitally concerned in a campaign which proposed to eradicate hookworm disease. It was determined therefore that each field man working in a given county should reach every single school in that county, making a thorough inspection to determine the sanitary conditions and then diagnose every case of hookworm disease among the pupils present and so report such cases found to both the parents of the child and the family physician. By doing this, it has been our object to urge the family physician and the infected child to seek each other and thus bring such a case to treatment. We have not sufficient data as yet to determine what degree of success this particular feature of our work has had, but it would seem to be one effective way to encourage treatment in many cases that have gone undiagnosed and untreated through neglect or indifference. Another feature of the school work has been a series of lectures on sanitation and hygiene, given by the field men to every school wherever visited. Unquestionably, these "health talks" to rural schools have been productive of great good, for they have been made so simple and so effective that even the children in such schools have been able to grasp the sanitary problems underlying the work. The field men who have so faithfully conducted these lectures are to be highly commended for rendering a very efficient service to our rural schools, so badly in need of help in dealing with such questions. It is indeed an urgent need of the educational system of our State which in some measure is being met by Alabama's State Board of Health.

The real tangible results of this school canvass have been very striking indeed and I regret that I have not time to go into the details of this feature of the work. Briefly stated however, in all, 111 schools have been inspected, and lectures have been given to over 4,500 school children. In addition to these lectures to schools many addresses have been given to public audiences. The number of lectures, including those to schools, totals over 200. It is estimated that over 25,000 individuals have heard these lectures and many more have been reached through the distribution of more than 100,000 leaflets on Hookworm Disease, the sanitary privy, and soil pollution.

Perhaps the most striking feature of the campaign in Alabama, as compared with that in the other southern states is the success we have had in the establishing and maintaining of Free Dispensaries for the treatment of indigent cases. The methods by which we have accomplished this form an interesting chapter in our field work, but I can do more here than merely state briefly some of the results. These so-called dispensaries are located in three or four important points of a county and are to be found in some special room provided for the purpose, or in many instances, in the drug stores of the town. On given days such a public place constitutes the headquarters of the field man in charge of the work. The dispensary is thoroughly advertised and the sufferers are urged to come for diagnosis and treatment. This move was adopted as an experiment and many of us were doubtful of its success, but the results so far have been so encouraging that we are proposing to adopt this as one of our methods in every county. At many places, much to our real astonishment, patients have actually flocked to these dispensaries. In five counties we have operated 14 dispensaries with a total number of cases treated to date of over 7,500. In this connection, it is interesting to note that

several physicians have stated that in their private practice they have been called upon to treat more cases of Hookworm Disease, since the free dispensaries have been in operation in their respective counties, than before they were opened.

The third line of work to be developed, namely the permanent sanitary survey, is quite naturally our most difficult problem. Its very nature makes it a slow process, and it is too early yet to see any very striking results of our work along this line. Here we have to deal with the all important question of *Soil Pollution* and the Sanitary Privy. Herein lies our real problem in education and reform and little could be expected along these lines in the few months we have been engaged in the campaign. In a future paper, I hope to be able to deal more fully with this feature of the work, after we have had more time to gain permanent results.

"MUNICIPAL SANITATION, ESPECIALLY OF SEAPORTS."*

By DR. R. H. VON EZDORF,

Passed Assistant Surgeon, United States Public Health and Marine Hospital Service, and Associate Professor of Tropical Medicine, Medical Department, University of Alabama.

At the Fourth International Conference of the American Republics, held in San Jose, Costa Rica, December, 1909, resolutions adopted with regard to sanitation of seaports were as follows:

II. (a) "To recommend especially to the various governments that they employ all possible means at their disposal to secure the effective sanitation of seaports, to the end that the introduction of plague, cholera and yellow fever may be prevented, and in the event that a case of either of these diseases reaches a port that it be promptly isolated and measures taken to prevent its spread.

(b) "To recommend special ordinances for the proper construction of rat-proof buildings, especially those designed for the storage of foodstuffs, such as markets, granaries, abattoirs, stables, etc.

(c) "To make obligatory the use of galvanized iron garbage cans, with tight-fitting covers, for the reception of refuse from houses, and to arrange for the daily disposal of such refuse.

(d) "That properly equipped laboratories be provided at all seaports, where the periodical examination of rats may be made, so that plague can be apprehended before its appearance in human beings.

(e) "That the crusade against the mosquitoes, 'Stegomia Calopsus' and 'Anopheles,' be carried on vigorously along lines which have been shown to bring the best results.

III. (a) "That careful statistics on population, morbidity and mortality be kept at every port, such data to be compiled at regular intervals of not more than one month, and also annually.

(b) "Every port should be provided with a proper system of sewerage, an adequate supply of pure water and paved streets.

(c) "That all habitations be constructed with a view to furnishing fresh air and sunlight sufficient to maintain health and vigor of the inmates, and that the character of the construction shall conform to local conditions.

(d) "That in every port there shall be a sanitary authority, clothed with ample power to vigorously enforce sanitary ordinances.

(e) "That it be made obligatory in schools to furnish instruction in the elementary principles of hygiene and sanitation. This instruction should be objective, or by means of publication of simple rules, or both."

It seems extremely important that the sea-

*Read before the Medical Society of Mobile County.

port towns should have first consideration in the matter of sanitation. These are the places where commerce between nations takes place, from which persons emigrate, which traffic is increasing from year to year.

The intercourse between nations with modern facilities for travel brings the different peoples intimately in contact, and consequently gives a greater risk and offers better opportunities for the spread of an infectious disease from one country to another.

Sanitation and hygiene have for their object the lessening and prevention of the spread of disease, and the ideal city would be the one having conditions whereby should an infectious disease enter or appear, there would be no spread.

These are the conditions implied in the resolutions adopted by the Fourth International Sanitary Conference.

The question arises, what sanitary measures should be adopted in a seaport town.

A seaport town is chiefly and foremost a commercial city which means that business interests have first consideration. A seaport town should be in such a state of sanitation that in the event a quarantinable disease should appear commerce could go on unrestricted.

There are, therefore, special conditions and problems to be met, the discussion of which is the subject of this paper.

All are agreed that a sanitary city should have a good and plentiful water supply, modern sewerage system, drainage, paved streets and sanitary dwellings.

Probably more imperative in a seaport than in any other town or city, there should be a strict division of interests, that is, a seaport should be divided into two parts:

1. Business section.
2. Residence section.

The tendency of development at the present time is to have such a division as may be seen from the growing development of the suburb for residences, leaving the cities more and more to business interests. The business section has its limited hours for work, principally during the day time. People congregate for the one object, in this section of the city, to attend to matters of business and commerce. There is no time or place for a sick individual, as he does not live in this section, we reduce the chances for infecting others. Disease prevails where people live; that is, in the domicile.

In nearly all cities building laws have been adopted and are enforced. In the business section of a city today, buildings of iron and cement blocks are being erected more and more. Why should not every building in a business section be so constructed? Comparatively cheap and substantial buildings are today constructed of cement and expanded metal or reinforced cement; floors and partitions of cement. Add to this structure modern plumbing, sufficient light and ventilation, and we would have a most desirable condition. Besides such a business section would be practically fireproof.

The water front of most seaports is today the most unattractive portion of a city one can find. We find low dives, cheap saloons, cheap lodging houses, etc., where every hygienic law is violated. Is it any wonder we find disease entering the city in such places? The sailor becomes infected at a foreign country; in two days or a week he is in our seaport. He enters those cheap houses most accessible to the water front and developing an illness, begins the spread of infection, all conditions being favorable for such spread. Whoever has worked in yellow fever epidemics knows how frequently the origin and spread of the disease is from these low districts.

Also, wharves are dirty and frequently infested with rats, roaches, flies, etc. Witness the frequency with which new vessels become invaded with such vermin upon lying alongside a wharf. Every vessel has such vermin aboard. We are recognizing more and more the importance of animal pests and vermin in the transmission of disease. Mosquitoes, flies, roaches, bedbugs, rats, mice, etc., are all known agents in the spread of disease. We

say today: No stegomyia, no yellow fever; no anopheles, no malaria; no rats, no plague; that is, no danger of spread.

There is no reason why the water front should not be made as attractive as any other business section of a city.

Wharves should be made of iron, cement or stone, and if of wooden pilings, these should be screened and so constructed that they will not have a place to harbor animal pests.

The superstructure of wharves should be of iron, floors of cement.

Those should be as well policed as the best paved streets of cities. The immediate streets to the wharf front should be of hard pavement material, well drained and easily cleaned.

The cheap lodging houses, etc., should be replaced by warehouses and business houses; that is, the business section of the city begins at this point and no residences whatever allowed here.

Our South American cities are making progress on these lines. At Buenos Aires, Rio de Janeiro and Santos, I understand, ideal conditions prevail on the water front. At Santos, where much money was spent in constructing stone and cement wharves, they tore up the comparatively new flooring and replaced it with cement.

It is where people live that disease prevails and spreads. Here also building laws should require modern plumbing, sufficient light and ventilation, house connection with the water supply and sewerage system.

Disease prevails chiefly among the poorer classes whose environments are usually unhygienic and unsanitary for the simple reason that they are unable to provide better conditions. The modern tenement house, well constructed and sanitary, is the only solution to this problem. Admirable work is being done under the direction of the tenement house department of our large cities. Their reports and exhibits are a revelation to one who has not followed the work.

I would add a few other requirements for buildings in the residence section. Houses should be made rat-proof by screening, cellars should be cemented. New buildings should meet every sanitary requirement as was mentioned for the business section of a city. Residences, like business houses, may eaily be constructed of cement and expanded metal over a wooden frame, which are likewise comparatively fireproof.

The individual becomes the next factor to be considered. He should be a co-operating factor in carrying out health measures. For this purpose the education of the individual in hygiene is all important and is advocated by all sanitarians.

The advance in providing the essential sanitary requirements for a people is an index of its civilization and prosperity. The health authorities should aim to provide all the essential conditions for a healthful environment for the individual. Laws and regulations should be adopted covering every such requirement. This is the goal of sanitary science.

We must seek to obtain pure air, pure water, pure food and sanitary dwellings. I will discuss briefly these requirements:

Pure Air—Laws are adopted to prevent the contamination of air by smoke; provision is made for cleaning streets and prevent the spread of dust, which for paved streets should be by washing and not by sweeping; spitting on sidewalks and in public places, dumping of refuse and dirt, which may spread as dust, should be prohibited. Foul emanations from any source should be corrected. Nuisance laws should be adopted to prevent contamination from other sources.

Reservation of grounds for parks and places of recreation and exercise should be made.

Pure Water—Clean potable water supply should be provided for drinking and bathing purposes. Public baths should also be provided.

Pure Food—Pure food laws, inspection of markets, milk depots, etc., are essential and should be adopted.

Dwellings—Building laws requiring sufficient lighting, ventilation, modern plumbing

and proper disposal of house refuse should be enforced.

For maintaining a sanitary environment, we must add that cleanliness in and about dwellings should be insisted upon.

We should therefore also provide for the proper removal of refuse, such as garbage, ashes and trash and filth which harbor vermin and disease. This is to be met by frequent and sanitary inspection service.

PUBLIC PLACES.

Brief mention will be made of the places requiring careful sanitary supervision.

Sanitary regulations should be enforced for public places, such as public buildings, clubs, hotels, lodging houses, markets, offices, railway stations, restaurants, theaters, public vehicles, etc.

A requirement should be made that all hospitals, charitable institutions, public buildings, hotels, markets, lodging and eating houses, restaurants, etc., be screened to exclude flies and mosquitoes, and I would add, periodical disinfection as often as possible. Public vehicles, such as carriages, to be cleaned at regular intervals at cleaning stations, and street cars to have floors washed daily.

Hotels will necessarily be located in the business section, but such only should be allowed as meet modern requirements.

Hospitals should be centrally located, easily accessible to both the residence and the business sections.

Markets—These may be located in the residence section.

Public stables should find no place anywhere within the residence section of a city. A requirement should be made that all stables, public or private, be made as near rat-proof as possible and kept free of flies; offal to be properly disposed of and cleanliness maintained.

Slaughter Houses—These should be well located outside of the business and residence sections—in fact, isolated. They should also be made rat-proof and should be well policed.

All infectious and contagious diseases should be made reportable; vital statistics should be complete.

Every seaport town should have a laboratory for investigation and study of all transmissible diseases. They should publish from time to time such literature as will describe in simple language measures necessary for the prevention of disease for the instruction of the people.

Disinfection—Disinfection should be carried out not alone for known infectious diseases, but more generally. As previously stated, I would include periodical disinfection of public buildings. I believe that an excellent sanitary measure would be the requirement of disinfection and inspection of vacant houses immediately before occupancy.

I have briefly outlined some of the essential requirements. Many cities have adopted sanitary regulations in their laws and ordinances, but the adoption alone of all such sanitary regulations will not accomplish results desired. What remains is the proper enforcement of such laws and ordinances. This is to be accomplished by having an inspection service which should be of the highest efficiency.

The inspection service should be a trained and intelligent force of men who can understand details and carry out orders. This branch of the board of health service is too frequently neglected; men are underpaid, and the results accomplished are in proportion to the service rendered. The board of health is nearly entirely dependent upon their inspection force, and it must be apparent that with a trained force of inspectors there will be an intelligent co-operating force operating under its direction.

Every branch of the service, whether meat inspector, milk inspector, fish inspector, house inspector, smoke inspector, market inspector, etc., should be composed of well paid and proficient men in their special branches. A medical inspection service should have supervision over this force and the board of health will then be more able to discover and find, by comparative statistics, where a deficiency oc-

curs, or what may be lacking in their sanitary regulations.

The advance in sanitation is usually in proportion to the prosperity of the community. The nation may be dependent on the seaport town for its commerce and wealth. But the sanitation of a seaport town on which an entire country may be dependent for its freedom from infectious diseases becomes a national problem. Through a seaport town a contagious disease may appear and then spread over the entire country.

If we leave the sanitation of a seaport to the municipality, much may be neglected as the tax necessary to meet the requirements would be too great on the community.

It seems, as the seaport has a national bearing, that the state and nation should come to its aid in providing the essentials, such as water supply, sewerage system, drainage and wharves.

To the city may be left to develop the details for maintaining the hygienic and sanitary environment of the individual, enforcement of the laws, etc.

The whole nation will take an interest, and as Surgeon General Wyman in his letter to Secretary Root says, "The good effect of sanitation in seaports will be so obvious that interior cities will take note thereof and profit by the example."

I do not lose sight of the fact that seaport towns are usually the oldest towns of a country and naturally the old conditions would need be materially changed. Nevertheless, it must be apparent that the business section of a seaport town centralized and, so far as practicable, free from any domiciles under the above named conditions, that the shipping interests could be safely conducted without embargo in the event a quarantinable disease found entrance.

No new construction, no building improvements should be made without permits, and where permits are granted they should conform with a fixed plan of development, just as in cities where plans of municipal architects are followed in making the "city beautiful."

With state and nation substantially represented in the sanitation of its seaports, far reaching results may be expected for a healthful nation.

Thus by sanitation of our seaport towns may be realized a national health in proportion to our national wealth.

TROPICAL DISEASES AND HEALTH IN THE UNITED STATES.*

By JOHN M. SWAN, M.D.,
Medical Director of The Glen Springs; Secretary of the American Society of Tropical Medicine, Watkins, N. Y.

Introduction.—Many of the problems that demand solution at the hands of the sociologist concern the parasites that infest the body politic, impairing its efficiency. The physician, on the other hand, particularly he who is engaged in the solution of the problems of sanitation, is concerned to a very large extent with the study of the parasites that infest the physical body, producing sickness and death.

Since the development of modern bacteriology, which saw its beginning in about 1870, the knowledge of the causes of the acute infectious diseases of man has had an interesting and rapid evolution. Following naturally the discovery of the exciting causes of various diseases, the methods of preventing the development of those maladies were rapidly worked out. But it was soon found that some affections that acted like other acute infectious diseases of known etiology could not be asso-

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ciated with a discoverable bacterium in the relation of cause and effect. The discovery by Laveran, in 1880, of the plasmodium malariæ and the demonstration of its animal characteristics led to fresh investigations. These studies, in turn, showed that some of the acute infections were due to animal parasites. The understanding of the life history of these organisms, however, has proven to be a much more complicated matter than the description of the biological characters of the vegetable parasites.

It has been found that many of the animal parasites of which man is the host cannot be transmitted from one individual directly to another. The parasitic organism requires a developmental period in an intermediate host before it can be inoculated into another individual there to develop and produce disease. The parasitic form which infects the intermediate host is usually different in morphology from that which produces the disease in man. The intermediate hosts are usually insects or some other animal low in the zoological scale. These low animal forms require warmth, moisture, and oxygen for their development. These three requisites are also necessary for the development of the parasites themselves, as well as for the growth of the vegetable parasites, bacteria, that produce disease.

All of the lower forms of life, whether animal or vegetable, flourish best in warm, moist climates, so that we find some regions of the earth more unhealthy than other regions, on account of the greater amount of moisture and heat with the resulting profuse growth of the lowest forms of life. In addition to heat and moisture, the lower forms of life require a certain amount of food in the nature of decomposing animal and vegetable material. This is found in abundance in hot, moist climates, particularly when no effort is made to prevent the accumulation of such decomposing masses. Furthermore, a hot, moist climate is debilitating to the human organism, so that initiative and energy are lacking and a disposition is developed to let things go as nature apparently means they shall go: the spirit to improve conditions is lacking. Consequently, we observe the establishment of a vicious circle; the native is lacking in energy; he permits masses of decomposing animal and vegetable matter to accumulate in the vicinity of his dwelling; this breeds the lower forms of life which are able to develop the parasites that produce disease; these parasites infect the dweller in their neighborhood. Those inhabitants that escape death are still further reduced in vitality and their efficiency is still further impaired. Furthermore, they are carriers of disease-producing parasites which increase in number, until finally, the neighborhood acquires an unenviable reputation as a pest hole.

Climate.—The climates of the world are divided by Dr. C. Hart Merriam (National Geographic Magazine, 1894, Vol. VI) into the Tropical Zone, the Lower Austral Zone, the Upper Austral Zone, the Transitional Zone, and the Boreal Zone, according to the total amount of heat present during the year. In the Tropical Zone there is 26,000 degrees F. of heat during a year, the hottest period showing a maximum temperature of 78.8 degrees or over. In the Lower Austral Zone the total heat amounts to 18,000 degrees F. with the hottest period above 78.8 degrees. In the Upper Austral Zone the total heat is 11,500 degrees F., with the hottest period below 78.8 degrees F. In the Transitional Zone the total heat is 10,000 degrees F., with the hottest period below 71.6 degrees F. In the Boreal Zone the total heat for the year is below 10,000 degrees F. and the hottest period is below 64.4 degrees F.

The Tropical Zone extends from the Tropic of Cancer, 23 degrees 30 minutes north of the equator, to the Tropic of Capricorn, 23 degrees 30 minutes south of the equator. But north of the Tropic of Cancer and south of the Tropic of Capricorn there is a belt, the Lower Austral Zone, in which for a considerable part of the year the climatic conditions are similar to those in the Tropical Zone. In the United States, this zone includes all of the Southern and Western states below the thirty-

fifth parallel of north latitude: South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, and parts of North Carolina, Arkansas, Indian Territory, Oklahoma, New Mexico, Arizona, and California. It is even probable that this line could be pushed as far north as the fortieth parallel. In 1909, for example, Philadelphia had a total amount of heat of 20,153 degrees F., this is over 18,000 degrees F. During the hottest period the thermometer registered above 78.8 degrees F. Even subtracting the 558 degrees excess temperature over the normal temperature for Philadelphia in 1909 the total heat would be 19,593 degrees, enough to include Philadelphia, which is 39 degrees 57 minutes north latitude, in the Lower Austral Zone. In 1910 the total amount of heat was 19,861 degrees F., with the hottest period above 78.8 degrees F. Similar studies would show that many places in the United States possess the necessary amount of temperature for their inclusion in this zone.

Requisites for the Development of a Disease from the Tropics.—In order, however, that any disease shall develop in a given region of the world, three essentials, in addition to a proper climatic condition, must be present: the cause of the disease, the proper transmitting agent, and susceptible individuals. Climatic features may be suitable, the cause of the disease may be present, susceptible individuals may reside in the district; but if the transmitting agent is absent the disease will not develop. If now the transmitting agent is suddenly introduced into that locality an epidemic of the disease will result.

On the other hand, the transmitting agent may be present and susceptible individuals may reside in a locality; but if individuals harboring the parasites be not present, the disease will not be found. If human hosts of the parasite come to the region in question bringing the parasites with them an epidemic will follow.

Relations of the United States with the Tropics.—The Anglo-Saxon race has had intimate relations with the tropics for over three hundred years. In 1579 Thomas Stevens sailed from Lisbon to Goa in India. So far as is known he was the first Englishman to visit that great empire. In 1583 three London merchants started overland for India. This enterprise was followed by the endeavor of three ships to make the journey around the Cape of Good Hope in 1591. The fabulous wealth reported to be in existence led to the formation of the British East India Company, which was chartered in 1600, and sent out its first expedition in 1601. Ever since then England has had intimate relations with the tropics and has known at first hand of the ravages of its diseases. That part of the Anglo-Saxon race which resides in the Western Hemisphere has had a merely casual acquaintance with the tropics until the occurrence of the Spanish-American War, in 1898. The acquisition of the Philippine Islands, Puerto Rico, and Guam, followed by our intimate relations with Cuba and the undertaking of the Panama Canal has brought the problems of tropical pathology and tropical hygiene strongly to our attention. We suddenly realize that many of our home ports are within the limits of the Lower Austral Zone: Galveston, 28 degrees 18 minutes N.; New Orleans, 29 degrees 57 minutes N.; Mobile, 30 degrees 45 minutes N.; Jacksonville, 30 degrees 45 minutes N.; Savannah, 32 degrees 4 minutes N., and that the United States-Mexican border extends for a varying distance north and south of the thirtieth parallel of north latitude. We then find that other of our ports have a total degree of heat that would be suitable, for a portion of the year at least, for the development of diseases supposed to be peculiar to the tropics, provided all the essentials were present.

We find 424,313 immigrants landing on our shores from tropical and subtropical countries in 1907, and 224,930 immigrants from the same regions in 1908. Our soldiers, our sailors, our missionaries and our business men are visiting the tropics in greater numbers with the advancing years. We further find that at home we have had for many years a disease common in the tropics, uncinariasis, or hook-

worm disease, probably imported from Africa with slaves. Tropical medicine, consequently, is a matter of intimate concern to the health of our country, and not a mere academic question. The immigrant and the homecoming citizen are important enough to require consideration in this respect, if we had never had an epidemic of yellow fever, or plague, or of cholera in our home territory. The prevention of an epidemic of imported disease, however, is a comparatively easy matter when the cause is known, and, at the hands of the United States Public Health and Marine-Hospital Service the introduction of epidemics has been and will be prevented so far as foreknowledge, foresight, and jurisdiction can accomplish the result.

The Essential Feature of the Prevention of Tropical Disease.—The one essential feature of prevention of tropical diseases is the cleanliness of our seaports, the cleanliness of our inhabitants, the cleanliness of our houses. By cleanliness is meant the drainage of mosquito breeding marshes and streams, the prevention of the development of flies, and the destruction of rats and mice, as well as the washing of bodies, the fumigation of houses and vessels, the sweeping of streets, the proper disposition of sewage and garbage, and the inspection of food products.

The Tropical Diseases.—The following list of disorders may be looked upon as including the diseases indigenous to tropical and subtropical countries which can be transmitted to temperate climates, upper austral and transitional, provided the requisite conditions of heat, moisture, intermediate hosts, parasites, and susceptible population are present in the given locality.

A. Disease due to protozoan (one-celled) parasites:

1, malaria; 2, hemoglobinuric fever; 3, amebiasis; 4, trypanosomiasis; 5, kala azar; 6, spirochetosis: (*a*), relapsing fever; (*b*), Rocky Mountain fever; (*c*), tabardillo.

B. Diseases due to metazoan (many-celled) parasites:

1, trematode infection; 2, cestode infection; 3, nematode infection.

C. Diseases due to bacteria:

1, plague; 2, cholera; 3, dysentery; 4, Malta fever; 5, leprosy.

D. Diseases of unknown etiology:

1, yellow fever; 2, dengue; 3, beriberi; 4, pellagra.

Malaria is a disease indigenous to the tropics and to subtropical countries. It is caused by a genus of protozoan parasites, known as plasmodium, of which there are at least three, and, according to some writers, more species. The parasite is known to undergo a cycle of development within its human host, which perpetuates the disease in the individual. While the various steps in this cycle are taking place regularly, a second form of development of the parasite takes place, which results in the production of forms that produce no symptoms in the human host; but which are capable of infecting the intermediate host. The intermediate host of the plasmodium is the female mosquito of the subfamily anophelinæ. Not all species of anopheles mosquitoes can become infected from the human host, but at least seven have been shown by actual experiment to be the efficient agents for the transmission of the disease. Manson, however, gives a list of thirty-two species from various parts of the world which are known or suspected to be efficient hosts of the plasmodium. After the parasite has passed through its development stage in the body of the mosquito, forms result that can be inoculated into a susceptible human subject by the bite of the insect, and so the disease is spread. No other method of transmission from man to man is known.

Mosquitoes always breed in water. Some species prefer clean, slowly running water; others prefer stagnant water; still others breed in collections of water in artificial containers. The members of the subfamily anophelinæ prefer, as a rule, the clean, slowly running water found at the edges of streams and in marshes in which there is some current.

The amount of sickness due to malaria in a

malarial country is incalculable. Woldert (*Texas Medical News*, April, 1908) estimates that malaria causes the loss of an equivalent of over five million dollars a year in the state of Texas alone. The most efficient way to prevent the sickness and death due to this disease is the destruction of the breeding places of the intermediate host of the parasite. Marshes should be drained or filled in. Streams should be cleaned of the growth of grasses, flags, and sedges which are found near the banks, delaying the currents, and providing by their interlacing roots safe retreats for the mosquito larvæ from their natural enemies. Artificial collections of water should be destroyed or efficiently screened so that the adult female cannot gain access to them for the purpose of depositing her eggs. All money spent by the state in this work is well invested. The return is seen in the increased efficiency of the individual, in the lowered death rate and sick rate, and, in the case of drained marshes, in the increase in the area of arable land.

A district in which there is no malaria may owe its freedom to the absence of the proper malaria carrying mosquito, to the absence of individuals harboring that form of the malarial parasite in their blood which can infect the mosquito, or to both. If the proper mosquitoes exist in a given neighborhood, but no infected individuals are present, no malaria will be found; but if human hosts, apparently in perfect health, with the suitable form of the malarial parasite in the blood are brought to the region, an epidemic of malaria will result. For example, if a rural district contains swamps or choked streams in which anopheles mosquitoes are breeding, and a gang of Italian or West Indian laborers, many of whom harbor malarial parasites, are imported for the purpose of some public work such as road building or canal excavating, an epidemic of malaria will follow.

On the other hand, a malarial district may be rendered almost nonmalarial by destroying the breeding places of the mosquitoes. The active work of the Department of Sanitation of the Isthmian Canal Commission in searching for and destroying the breeding places of mosquitoes in the Canal Zone, and screening the quarters of the employees, has resulted in the reduction of the morbidity from malaria from 821 per 1,000, in 1906, to 282 per 1,000 in 1908, and 215 per 1,000 in 1909. The mortality was reduced from 8.77 per 1,000 in 1906, to 1.34 per 1,000 in 1908, and 1.10 per 1,000 in 1909. This result can be paralleled in any American community by similar methods with a relatively small outlay of money.

The Italian method of furnishing quinine to the inhabitants for prophylactic purposes is not nearly so efficient; nor is the method which relies on screening the dwellings of the inhabitants without a campaign for the destruction of the mosquitoes and their breeding places.

Hemoglobinuric fever, or blackwater fever, is believed by many writers to be dependent upon previous malaria. If this be so, the control of the latter will be attended by the disappearance of the former disease. There are students of tropical problems, however, who believe that hemoglobinuric fever is an independent disease. If this be true it should be placed among the diseases of unknown etiology. Hemoglobinuric fever is present in the Philippine Islands, in the West Indies, in Central and South America, in the Canal Zone, in Texas, and in Arkansas, and probably in other parts of the lower austral zone of the United States. So far as we know at present its deleterious influence upon the public health is not great and no alarm need be felt for an extensive propagation of cases.

Amebiasis is a disease due to a protozoan parasite, entameba histolytica, which attacks the large intestine of man and of the lower animals. The infection manifests itself by attacks of dysentery, and in many of the cases, as high as 33 per cent in some instances, it is followed by abscess of the liver. The parasite is apparently transmitted from man to man by potable water. It is possible that it may be transmitted by green vegetables, in localities where human feces is used as ferti-

lizer, as is the custom in China and other Eastern countries. Its spread may be stopped by boiling the drinking water, by the prohibition of the use of human excrement as a fertilizer, and by the prohibition of indiscriminate defecation into streams or other sources of water supply for towns, villages, or isolated farm houses.

Amebiasis is prevalent in the Canal Zone, certain of the West India Islands, some of the Southern states, for example, Louisiana, Puerto Rico, and the Philippine Islands. Individuals with intestinal trouble returning from these countries should be carefully studied for the detection of these parasites.

Trypanosomiasis is a disease due to a protozoan parasite, trypanosoma gambiense. It is at first a febrile complaint which bears some resemblance in its clinical manifestations to malaria; but in its last stages it is accompanied by a marked degree of lethargy and is commonly known as sleeping sickness. The parasite is transmitted from man to man by a dipterous insect; the tsetse fly, glossina palpalis. The disease is confined to the valley of the Congo river, the shores of Victoria Nyanza, and other parts of tropical Africa. So far as is known glossina palpalis does not breed on the American continent, consequently no harm is to be apprehended from this disease in the United States, even if an infected individual should land upon our shores. If glossina palpalis can be bred in our own lower austral region, the United States Public Health and Marine-Hospital Service will have to institute active fumigation measures on all ships coming from African ports to our Gulf and South Atlantic ports to prevent the domestication of the fly.

Kala azar is a disease due to protozoan parasite, Leishmania Donovani. It is found in Assam, Madras and Bengal. The method of transmission of the parasite is not known, and no danger is to be apprehended from this disease. Dr. S. T. Darling, however, has observed a few cases in the Canal Zone similar to kala azar, and has found a parasite of similar appearance in the organs of the patients at necropsy. This parasite has been called histoplsama capsulatum. The possibility of serious danger to the public health from such a source is remote.

The best known example of spirochetosis is the European relapsing fever, due to an organism known as spirocheta resurrens. A few imported cases have been seen in this country and small epidemics have been recorded in New York and in Philadelphia in past years. The parasite is supposed to be transmitted by the bedbug or the body louse. No extensive epidemic of this disease has been observed in this country and its further prevention will be accomplished by isolating imported cases and by the disinfection of the belongings of the patients for the destruction of any vermin that they may harbor.

In the Bitter Root Valley of Wyoming, and in some other parts of our Rocky Mountain region there is an epidemc disease, known as Rocky Mountain fever, which is known to be transmitted by the bites of certain ticks, dermacentor occidentalis. It is probable that this is a spirochetosis.

The disease endemic in Mexico known as tabardillo, which caused the death of the investigator who proved the transmission of Rocky Mountain fever by the bites of infected ticks, Dr. H. T. Ricketts, is in all probability of the same nature. The public health authorities of the states forming the United States-Mexican border, Texas, Arizona, New Mexico and California, will have to meet the problem of the prevention of the importation of this infection into our domain with the increased communication across the border.

The diseases caused by metazoan parasites are, as a rule, intestinal disturbances due to the presence of the parasites in the alimentary tract. There are one or two exceptions to this rule, notably the disease known as schistosomiasis, in which the parasites and their eggs are found in the blood vessels of the gastro-intestinal canal or of the genito-urinary organs, and the disease known as filariasis, in which the parasites are found in the lymphodes or the connective tissue in the various parts

of the body. In filariasis the embryos are found in the circulating blood.

Many of these parasites gain entrance to the human body with food or drink, others require development up to a certain stage in intermediary hosts, still others gain entrance to the human body through the skin. Much work remains to be done on the life histories of many of these animals before definite knowledge of the manner of infection is to be had.

The trematodes are low forms of the natural order Vermes. With one exception they are hermaphroditic organisms which infect the various parts of the gastro-intestinal tract. One variety, which is indigenous to the Philippine Islands and other far Eastern countries, is found in the lungs. The parasites are not known to be indigenous to any part of the United States although it is not beyond the range of possibility that they may be represented in our home territory. However, climatic conditions are such in our lower austral zone that, provided suitable intermediary hosts are present, they may become established in this country. So far as we know, cleanliness in personal habits, care in the preparation of food, and abstention from eating uncooked fruit and vegetables are all that is necessary to prevent the spread of such infections.

Schistosomiasis is the disease produced by a trematode parasite, in which the male and female generative organs are contained in separate bodies. The disease is also known as bilharziasis. It is common in Egypt and in some other parts of Africa, and in Asia. A form of the disease has been met with in the West Indies and in some parts of Central and South America. The symptoms depend upon the location of the parasites and their ova. Sometimes an inflammation of the bladder results; in other cases the symptoms resemble those of dysentery. A variety of this infection is met with in China and Japan, one case of which has been imported into this country.

The cestodes are the tapeworms. Infection with these parasites is by no means confined to the tropics or to subtropical countries; but in both these regions cestode infection is more common than in temperate climates. Nearly all of these parasites depend for their development in man upon the eating of insufficiently cooked meat. The inspection of our abattoirs by the officials of the United States Department of Agriculture prevents the marketing of infected meat, and is a public health measure of the first order. The proper cooking of meat is further responsible for the rarity of the occurrence of these worms in Americans.

The nematodes are the round worms. Infection with one of these is fairly common even among the children of the better class. Infection with the hookworm, necator americanus, has been shown within the past ten years to be very common in the Southern States. Trichiniasis, infection with trichina spiralis, is seen in rare cases. Filarial infections have been reported in our home territory. Prevention of these infections varies with the individual parasite.

Ascaris lumbricoides infection is to be prevented by teaching children to be careful of the things which they put into their mouths. We do not know the life history of this parasite, but infection appears to be the result of taking the embryos or the ova into the digestive tract.

Hookworm disease, uncinariasis, is a serious problem in our Southern States. The embryos develop in moist, sandy soil, and gain entrance to the body through the skin. The wet sand adheres to the skin of the legs and feet, and the embryos burrow into the underlying tissues and finally reach the intestine by a circuitous route. The disease has long been known in Egypt and other parts of the tropics of the Eastern Hemisphere as anchylostomiasis. It was a serious public health problem during the construction of the St. Gothard Tunnel, in 1880. Our army medical men found it in Puerto Rico, and subsequently the parasites were discovered in the South. Its presence results in a severe anemia which may be fatal. The prevention of the extension of the disease can be accomplished by the prohibition of soil pollution and by educating the

people to wear shoes. In many localities the inhabitants are too poor to buy shoes. In such circumstances prevention of indiscriminate soil pollution is first in order. The amelioration of poverty, on the other hand, so that each individual can obtain enough compensation for his work to be able to buy shoes for his family is a question for the political economist and the tariff commission.

It has been found in Puerto Rico that in cases of certain ladies of the better class who harbored necator Americanus, the infection had occurred through the skin of the hands from working in flower gardens, the soil of which had been fertilized by human feces. It has also been suggested that uncinariasis was one of the causes of the high morbidity and mortality among the Union prisoners in Confederate prisons from 1861 to 1865, particularly in Andersonville.

The Rockefeller commission will undoubtedly succeed in banishing this infection from our Southern States. It must, however, prosecute a long campaign of education before it can improve the sanitary conditions in the rural districts and inculcate new habits of personal hygiene in the inhabitants.

In filariasis the adult parasite inhabits the lymph nodes and the connective tissues. The embryos circulate in the peripheral blood. The presence of these parasites excites a train of diseases, the best known of which is elephantiasis. The disease is present in certain of the West India Islands. The embryos are taken into the stomach of a female mosquito and undergo a metamorphosis in the thoracic muscle of the insect. After the change in the embryos is completed, they migrate to the proboscis of the mosquito and are inoculated into the new individual by the bite of the insect.

Whatever of danger there may be in the importation of filariasis into the United States is to be obviated by a mosquito campaign. In this infection the intermediate host is not only the mosquito of the subfamily anophelinæ but also certain species of the subfamiyl culicanæ. The culex mosquito will breed in any kind of water, some species developing in almost pure filth. Consequently, it is not only necessary to drain marshes and to clean out streams, but also to dispose of all collections of still or stagnant water; the water in flower-pots in cemeteries, in discarded tin cans, in broken bottles, drains, cisterns, etc., has been found swarming with culex larvæ. The collections of water in the hollow branches and the trunks of trees, and in the corollas of many plants, such as the pitcher plant, have been found to be breeding places for these insects. There is no danger of the direct transmission of filarial infection from man to man.

Of the diseases due to bacteria, plague is the one of most interest to the American health officer. The disease is due to an organism known as bacillus pestis. Through the work of the English Plague Commission, done in Bombay and its environs, it has been definitely established that the disease is originally one of rats and mice and that it is carried from rat to rat by the bites of infected fleas. After the rat population of the city has been reduced by the epizootic, the fleas, no longer finding sufficient animal food, turn their endeavors to and become temporary ectoparasites of man. The epidemic then spreads from man to man by the bites of infected fleas. In a few cases, about one per cent in a large epidemic, the disease exists in man as a pneumonia excited by the bacillus pestis, and this form of the infection is transmissible from man to man directly by infected sputum, which is disseminated by coughing, and by soiled bed linen and personal linen.

In the prevention of an epidemic of plague, the destruction of rats and mice, is the important sanitary problem. The isolated patient is not dangerous provided he is not suffering from the pneumonic form of the disease. Plague has been present in San Francisco twice within the past ten years. In 1900 the business men and health officials of San Francisco made a serious blunder in denying the existence of the disease, and, by their attitude, causing the resignation of an officer of the United States Public Health and Marine-Hospital Service who was eminently equipped

for coping with the situation. As a result, the disease ran for a period of two or three years with occasional cases reported, and the rat population of San Francisco became generally infected so that in 1907 plague again appeared in that city. This time, however, profiting by the former error, the health authorities of California and of San Francisco summoned the federal authorities to their aid and, by placing the matter entirely in the hands of the latter, had the satisfaction of seeing the epidemic stopped in eight months with at total of 160 cases and 78 deaths. Fifteen cases occurred in Oakland and Seattle with 10 deaths. During this period the Public Health and Marine-Hospital men were killing 10,000 rats a week, about three per cent of which were found infected with bacillus pestis. The officers in charge of the work further developed the fact that the wood squirrels about Oakland were infected with plague, and measures have been taken to destroy these rodents.

The destruction of rats in our seaports is a problem that should at once receive attention from the proper sanitary authorities. A ship coming from a plague port with infected rats in its hold should be so moored that these animals cannot get ashore. For this purpose rat guards have been devised for the purpose of preventing the rodents from leaving the vessel at night by way of the hawsers, and starting an epizootic among the rats on land. Once started in New York or Philadelphia these cities would pass through an experience similar to that of San Francisco. The rat population is ready to hand, the rat flea is ready with his host, and the climatic conditions from May to October are suitable.

No advantage except a temporary one, is ever gained by denying the exisence of an epidemic in any city. The hiding of the facts gives a chance for the disease to gain headway and to result finally in a greater loss to business and a more appalling loss of life than though the disease were admitted to exist from the beginning and proper phophylactic measures immediately instituted.

Cholera is due to the bacillus choleræ. It is a water-borne disease, the infected individual polluting the water supply by improper disposition of his feces. Flies are sometimes responsible for epidemics by first alighting on objects contaminated with the bacilli and then alighting upon exposed food stuffs. It is hardly to be conceived that an epidemic of this disease should start in any of our American cities. The quarantine officers are constantly on the lookout for cases of intestinal disturbance in immigrants from parts in which cholera exists, as well as in the members of the crews of the vessels.

In Mohammedan countries many pilgrims returning from Mecca bring holy water with them from the Holy City. In order to give all the faithful an opportunity to benefit from the water, the contents of the bottle are emptied into the well or other source of water supply of the village to which the pilgrim belongs. Since the holy water frequently contains cholera bacilli, an epidemic results. With the increasing Mohammedan population of the Pacific coast this is a problem that may confront our health officers in the future. Infection of the individual is to be prevented by boiling the drinking water, by abstaining from the use of uncooked foods, and by care in the production of the milk supply. The house fly should not be neglected. The patient is not dangerous provided his intestinal and other discharges are properly sterilized before being consigned to the cesspool or sewer. Burning is the most efficacious method of disposing of infected human feces.

Dysentery, except the amebic form, already referred to under the head of amebiasis, is due to bacillus dysenteriæ. The epidemics are of minor import, so far as they have occurred in our own land. In the tropics and in subtropical countries, where the climate is depressing and where the poorer classes are more constantly underfed and overworked than with us, the disease often assumes serious proportions. It is water-borne and requires the same preventive measures that apply to cholera. The fly problem is important in its relation to this infection.

Malta fever is caused by the micrococcus meltensis. Cases of the disease are found in the Mediterranean littoral in greatest numbers. Cases have been found in Cuba and Puerto Rico, Central and South America, and it is not beyond the range of possibility that cases occur along the United States shores of the Gulf of Mexico. In Malta, the disease is supposed to be transmitted by drinking the milk of infected goats; these animals supplying the milk for the inhabitants of the island. The disease is not very severe and the death rate is small, about three per cent. It is responsible, however, for a large amount of invalidism. The problems to be solved in case it should ever be found in our country are entirely hypothetical.

The attitude of the public toward leprosy is a blot upon our civilization. The disease is caused by the bacillus leprae. It is not, strictly speaking, a tropical disease, Norway and Iceland being countries in which it is indigenous. It is transmitted only by very intimate personal contact. The patient is not a danger to the community in which he dwells, unless it be proved that the suspicion, now entertained, that the organism is transmitted by the bites of infected bedbugs is warranted. Even then cleanliness is the answer to the public health question involved. The segregation of lepers in colonies is advisable on account of the repulsive nature of the deformities seen in the advanced cases; but not because there is any fear of an epidemic.

Leprosy is endemic in many Central and South American States. There is a leper colony in Louisiana. It is common in the Hawaiian Islands, in China, in Japan, and in the Philippine Islands. The treatment of the unfortunate victim of this disease who was discovered in a village in Maryland about two years ago is shameful, productive of no good to the general public, and an insult to twentieth century knowledge.

Of the diseases of unknown etiology, yellow fever has been our most serious tropical problem. The disease is endemic in Cuba and in Brazil and has frequently been seen in epidemic outbreaks in our Southern States and in Central and South America. Some cases have been seen on the west coast of Arica, and epidemics have occurred in the past in Philadelphia, New York, and Baltimore.

The work of the Yellow Fever Commission of the United States Army in Havana, in 1900, has proved that the disease is transmitted by the bite of infected stegomyia calopus mosquitoes. The problem of prevention of epidemics, therefore, resolves itself into the destruction of stegomyia calopus. This was successfully demonstrated in New Orleans in 1908. Stegomyia calopus apparently always breeds in artificial collections of fairly clean water. Consequently the screening of cisterns, wells and reservoirs is absolutely necessary. The patient must be treated in a ward or an apartment screened from the access of mosquitoes, and the apartment from which he was removed at the onset of the disease must be fumigated for the purpose of killing what adult mosquitoes may be contained in it; but for no other reason. The patient is harmless, except he is bitten during the first three or four days of his illness.

The American people owe a debt of gratitude to Dr. James Carroll, Dr. Walter Reed, Dr. Jesse Lazear, and Dr. Aristides Agramonte which pensions and monuments can but partially repay. It is a parsimonious congress indeed that will neglect the widows of Dr. Carroll and Dr. Reed while it corrects the military records of patriotic deserters.

Dengue is frequently met with in epidemic form in the Southern United States and in the West Indies. It is a considerable factor in morbidity statistics in the Philippine Islands. It is met with in many tropical and subtropical countries. It is not dangerous to life, the death rate being less than one per cent, and the fatal cases being seen in individuals who were already suffering from some chronic complaint when attacked by dengue. Our knowledge of the transmission of dengue is due to the work of the United States Army Board for the study of tropical diseases as they occur in the Philippine Islands, Dr. P. M. Ashburn and Dr.

Charles F. Craig. These investigators, following the methods pursued by the Yellow Fever Commission in Cuba, have demonstrated the transmission of the disease by the mosquito culex fatigans. The prevention of epidemics of dengue is a question of mosquito extermination.

Beriberi is a disease indigenous to China, Japan, the Philippine Islands, the Malay Peninsula, and India. It is characterized by an acute febrile period, followed by dropsy, and later, by paralysis. The cause of the disease is unknown. The majority of students of tropical pathology are of the opinion that it is the result of the consumption of spoiled rice. Some few observers believe it to be dependent upon an unknown parasite.

The presence of a case of beriberi upon a vessel from an Indian, a Chinese, or a Japanese port is no excuse for scareheads in the newspapers. It is perfectly safe to treat such a patient in the general wards of a New York hospital.

Conclusion.—It is no part of the intention of the writer of this paper to increase the causes of uneasiness of certain susceptible individuals among his countrymen. The knowledge that certain diseases exist, that they have well known causes, that they are disseminated by well understood agents, and that their spread can be prevented by well tried methods, should make for peace of mind rather than for worry. A man who is on his way home at night will not fall into the ditch, provided he knows where the ditch is. The knowledge of the existence of an epidemic disease is the most important element of the campaign to eradicate the disorder.

The application of the various sanitary methods referred to in the course of this paper is of the first importance wherever men are gathered together. We are fairly well informed as to the value of a noncontaminated water supply, of a clean milk supply, of clean streets, of proper garbage and sewage disposition. All these things cost money, but we now know that the money is well spent. Campaigns of mosquito extermination, of fly destruction, or rat and mouse extirpation will be found to be investments that will pay.

In the Nobel Lecture at Harvard on December 14, 1910, ex-President Roosevelt said:

> Many men have rendered high and honorable service to the United States in connection with the work of the Panama Canal, but by far the greatest and most important work has been rendered by Colonel Goethals. It is to him more than to any other one man that we owe the successful accomplishment of one of the great business and engineering feats of all the ages.

When it is completed, Colonel William C. Gorgas will have made possible "more than any other one man" the construction of the Panama Canal. The Canal would have been a French achievement, had it not been for yellow fever and malaria. Whatever of dishonesty in affairs may have existed in the French company was of small import beside these two tropical diseases. Shoulder straps have never prevented the bite of a malaria carrier, nor of a yellow fever carrier.

[NOTE.—The author would acknowledge his indebtedness to Mr. George S. Bliss, of the Philadelphia office of the United States Weather Bureau, for valuable help concerning the climatological data herein contained.]

IS THE SO-CALLED "COTTON MILL ANEMIA" OF THE GULF-ATLANTIC STATES DUE TO LINT OR TO HOOKWORMS?*

By CH. WARDELL STILES, Ph.D.,
Professor of Zoology, U. S. Public Health and Marine Hospital Service.

That there is a widespread and severe anemia found among cotton mill hands in certain portions of the United States is evident to any person who visits a large number of the mills.

Various explanations have been advanced to account for this condition. One of the views most frequently advanced is that it is due to "breathing in the lint." This explanation is so very commonly accepted that it will be discussed here.

The Lint Theory vs. the Hookworm Theory.—As a premise to the lint theory it will be admitted that the cotton is essentially identical in all the cotton mills in this country, hence that all employees of cotton mills, so far as they are breathing in the lint, are breathing in the same kind of lint, no matter in what part of the country the mills are located. Accordingly it seems reasonable to expect that the distribution of any anemia due to the lint and to no other cause will be more or less uniform.

Possibly one exception should be made to this premise, namely, possibly the effects of colored lint might, because of the dye used, be more injurious than that of uncolored lint.

(1.) Accordingly, the hands in the cotton mills of New England ought to show the same type of anemia as do the hands of the cotton mills south of the Potomac and Ohio Rivers, and that particular type of anemia ought to be developed to approximately the same extent and degree in both localities; any other conclusion will involve the admission that there is some cause other than lint present.

Now as a matter of fact it is especially the Southern mills for which this mill anemia has been described, and this is due to the fact that this particular anemia occurs in only exceptional cases in the northern part of the country. I have personally seen more than 2 000 cases and suspects in the Southern cotton mills, but not a single case or suspect in visiting the New England mills, despite the fact that the employees in the New England mills are breathing in lint taken from the Southern cotton fields.

(2.) Again, if this anemia is caused by breathing in the lint, it is natural to expect that mills of a similar character located in the eastern, central, or western part of North or South Carolina, also that mills located in the southern, central, or northern part of Georgia or Alabama, will show approximately the same proportion of anemia, for the hands in all of these mills are breathing in the same kind of lint. As a matter of fact these expectations are not fulfilled. For instance, in mills of the central clay lands of the Carolinas, Georgia and Alabama, there is a relatively low percentage of the hands who are pronouncedly anemic and it is *relatively* less frequent that one finds a very severe case; these mills are run chiefly with labor that has come from the *clay* farms, and most of the anemic cases I have seen in these mills, especially the severe cases, give a history of having come to the mills from the *sand* lands. If now we visit the upland mills in which there is a greater proportion of *mountain* labor, the number and severity of cases of anemia is increased. Going in the opposite direction, toward the coast, it is seen that as soon as the mill labor comes from the sand lands, the anemia is again increased over that of the clay land mills, in some sand localities there is such a mass of anemia in some of the mills that one wonders how the factories can afford to

*At the request of Dr. Charles P. Neil, Commissioner of Labor, an investigation into the prevalence of hookworm disease in the cotton mills was undertaken. Certain portions of the results obtained will be published in the reports to be submitted to Congress by the Bureau of Labor, while the more strictly medical discussions will be published elsewhere. The present article represents one in the series to be issued.

run with their hands in such poor health. Yet mill hands, 47.3 per cent. of whom were found anemic, are breathing in the same kind of lint that is breathed in by hands in the clay land mills, which show from 0 to only about 2 1-2 to 5 or 10 per cent. anemia apparent upon rapid inspection.

This variation in the anemic condition of the hands in a cotton mill according to the origin of the people (from mountain, clay or sand regions) is a point of very great importance.

If the mills and factories of North Carolina are arranged serially in accordance with the percentages of hookworm suspects observed, it will be noticed that *in general* the entries run from West to Middle East, in reference to their location in the state. It will also be noticed that the lowest percentages of anemia are found in the establishments the hands of which are of clay or city origin. As soon as there is a pronounced influence of labor from the mountains, there is an increase in the percentages of anemia. A similar increase occurs as soon as the sand labor becomes marked. When the sand labor becomes predominant and when it becomes practically the only class of labor the anemia becomes very pronounced.

It is submitted that in the cotton mills in which in one factory only 1.5 per cent. of the children were anemic to a noticeable degree, or in one in which only 5.7 per cent. were suspects, these persons are breathing in the same kind of lint as are the children in a certain cotton mill in the eastern part of the state, where 80.9 per cent. of the children were in the same condition; the latter were so clearly infected with hookworm disease that a microscope was not necessary in order to make a diagnosis.

If there is anything in this idea of the relation of the soil to the anemia, in contradiction to the "lint theory," it is reasonable to expect that in Alabama and Mississippi this line of increase in the anemia will run from the Anniston-Talladega-Sylacauga district north and south instead of from east to west. That this is actually the case is seen from an examination of a number of mills.

It was found that in three mills located in the clay belt there was no suspect* found. With the influence of mountain labor in the northern part of the state, the increase in the suspects became marked. As soon as the sand labor became predominant in the southern portion of the state, a still greater percentage of suspects was found.

Thus the line from west to east in North Carolina has shifted from north to south in Alabama, corresponding with the shift of the line of mills drawing their labor from mountain, clay, and sand localities.

A study of the percentages of suspects for the mills of South Carolina gave the same general results, but in less striking manner.

The mills of Georgia, also, gave the same general results, namely, a revatively low percentage in the clay and city mills; an increased percentage in clay and sand, and a very high percentage in a sand land mill.

In classifying these mills according to the origin of labor, my information was obtained from the local physician, from the mill officials, and from the hands themselves; it was especially the hands showing anemia from whom information was sought as to their origin.

Combining all of the mills and factories visited we obtain a chart or curve which brings out very strikingly the general rules: (1) that mills with clay land and city labor show the lowest percentage of suspects; (2) that mills with sand land labor stand in general intermediate between the sand mills and the clay mills; and (3) that mills with mountain-and-clay show a higher percentage of suspects than do the clay land mills.

That these general rules are not in harmony with the "lint theory" is evident. They are, however, in harmony with the idea that this widespread anemia of the mills in question is due to hookworm disease, for in our country this malady is *preeminently* a disease of the

*If microscopic examination had been made, some cases would doubtless have been found.

sandy regions and is *relatively* less frequent in the clay regions; in mountainous regions it increases over the clay regions.

Again, if it is breathing in the lint that causes this anemia, it seems reasonable to expect that there would be approximately the same amount and the same severity in the anemia in the mills in the same district, with labor which is in the first, second, or third generation of mill life, (namely, first, second or third generation from the farm) since in all of these mills the hands are breathing the same kind of lint; if any difference were to be found, under these premises, it seems reasonable to assume that this difference would be in favor of mills with labor which is in its first generation of mill life, for these mills would naturally be newer mills, built in times when greater attention is given to the subject of light, ventilation and plumbing. As a matter of fact these expectations are not fulfilled.

Take, for instance, two of the mills at S———. One mill was started in 1881, and according to statements both by the president of the mill and his superintendent, neither of whom, when first asked, knew the purport of my question, the hands in this mill are in general one to two generations further removed from farm life than are the hands in the newer mill, started in 1900, about 1½ miles distant, and conducted by the same company. The newer mill is superior to the older mill in more than one respect, and the sanitary arrangements (in reference to the privies) of the newer mill village (looked after by the mill) are in decidedly better condition than are those of the old mill (attended to by the city authorities). In the old mill the anemia was found to be present in about 3.5 per cent. of the people seen; in the new mill, in 21.6 per cent.; among the children in the old mill, 5.7 per cent. were classified as suspects, and among the children of the new mill, 43.1 per cent. were suspects.

Or take two mill settlements in and near G———. The older has been in existence since 1847; the newer (about 3 miles distant), operated by the same company, has been in existence since 1878; so far as ventilation is concerned the new mill is superior to the older mill. In the old mill I found a grandfather, his son and his grandson at work. Inquiry (again without any intimation as to the purport of the question) developed the fact that the majority of the mill hands in the old mill settlement are in their second and even their third generation of mill life, while in the new mill there is a very large number of hands who had come from farms into the mills within three years prior to my visit. In the old mill settlement, in two day's work I found only 15 cases of possible "cotton mill anemia" (among whom only two cases were confirmed microscopically, while two additional cases proved to have a chronic diarrhoea which probably led me to select them for examination), while in the new mill I found not less than 15 cases of pronounced "cotton mill anemia" within less than half an hour; these latter cases were so severe and so typical that the use of the microscope was unnecessary in reaching a diagnosis.

This difference between mills in which there is a great excess of labor in its second generation of mill life and those in which labor is in its first generation of mill life, is not in harmony with the "lint theory." It is, however, entirely in harmony with the hookworm explanation, for in this disease the infection is gradually reduced by removing the people from soil pollution.

Again, if that extreme anemia of the southern cotton mills is due to breathing in the lint, it seems reasonable to expect, with at least some degree of probability, that the greater proportion of severe cases will be found in the rooms (as the card room) in which there is a greater amount of lint flying around, while a lower proportion of cases and a less severe type of the disease might reasonably occur in the rooms (such as the spinning room) in which less lint is observed in the air, and no severe case need be expected in the cloth room and in the engine room (where lint is practically or entirely

absent). These expectations are not in harmony with my observations in about 120 cotton mills. By far the greater percentage of cases occur in the spinning room; I found one exceedingly severe case in a card room in R———, but incidentally it may be mentioned that the boy had only recently (less than two weeks) come in from a farm and was a new hand at cotton mill work. I failed to make a note of the room in which the most severe case in the P——— mills was observed, but my recollection is that this case also was in the card room (incidentally the boy had worked in the mills about three weeks). In general, the cases of marked "cotton mill anemia" in the card room are not to be compared either in frequency or degree, with the cases in the spinning room.*

*The persons employed in the card room are as a rule older than those employed in the spinning room.

The most severe case found in a certain mill in South Carolina was in the cloth room; the young man (26 years old, wore short trousers and appeared to be about 16 years old) had a blood which in its hemoglobin was only 30 per cent. of normal, while his red corpuscles were 3,440 000; he told me that he had never been "healthy" (!) until he came to work in the cotton mills.

Undoubtedly the worst cases of anemia seen on the entire trip among any hands in the mills were two boys in spinning rooms.

(5.) Again, if that extreme anemia of the mills is due to breathing in the lint, it seems reasonable to expect that persons fresh from the farms will not be very anemic, but that the longer they work in the mills the more anemic they will become. Now I am prepared to admit that this is undoubtedly the case in some instances, but it certainly is not the case among the vast majority of employees, especially of "sand hill" or mountain origin.

For instance, in a certain mill I saw two young women who had worked in cotton mills for several years. Both were in the last stages of consumption, which one stated she had contracted before she entered the mills; the other girl had both hookworm disease and pulmonary tuberculosis. That cases of this kind should grow worse in cotton mill life need not be surprising. But the vast majority of cases are not of this kind.

The worst case of "coton mill anemia" encountered on the entire trip was in a boy 12 years old (he looked as if he were, possibly, 8 years old) in the spinning room of a certain mill in South Carolina. According to statements both by himself, his brother, and the mill officials, this boy had been in the mill only a few weeks. He was, with possibly one or two exceptions, the most extreme and the most typical case of hookworm disease I have ever seen who was able to work. Reference has already been made to a young man 26 years old, with a hemoglobin of 30 per cent. who told me that he had never been *"healthy"* (!) until he came to the mills. This statement was confirmed by his father. Reference has also been made to the most extreme case in the P—— mills, a boy who had worked in the mills only about three weeks. Other cases of this kind could be cited for other mills.

One of the most extreme and most typical cases of "cotton mill anemia" seen on the entire trip was a young man in a certain mill village in South Carolina. This boy had never worked in the mills, but was visiting some friends.

Statements were obtained from the following cases and suspects in regard to the length of time they had worked in the mills:

"Only recently"	6 persons
Less than 2 weeks	1 person
2 weeks	1 person
3 weeks	1 person
"A few weeks"	2 persons
6 weeks	1 person
4 months	1 person
6 months	1 person
6 to 8 months	1 person
7 to 9 months	2 persons
8 months	2 persons
9 months	3 persons
"Less than 1 year"	1 person
Total less than 1 year	23 persons
1 year	6 persons
1 to 2 years	3 persons
2 years	4 persons
3 years	4 persons
3 to 4 years	4 persons

4 years	4 persons
5 to 6 years	1 person
6 years	4 persons
6 to 7 years	1 person
7 years	2 persons
8 years	1 person
10 years	1 person
11 years	1 person

Thus of 59 suspects 23 persons (among whom were most of the more severe cases seen), or 38.9 per cent had worked in the mills less than one year, while 36 persons, or 61 per cent had worked in the mills more than one year.

These 59 persons are unselected cases, except that the 23 cases under one year contained among them practically all but two of the most severe cases seen; in these cases the question was asked purposely; in the other cases incidently.

The question naturally arises: Assuming that no new hookworm infection occurs, how long will the infection persist after these people come to the mills?

A definite answer to this question cannot be given, but certain observations bearing on this point may be cited: In 1902, I found hookworm eggs in children in an orphanage who had been absolutely removed (so far as could be determined) from all possible source of infection for the following periods of time: 8 children, 2 years or less; 4 children, between 2 and 3 years; 2 children, 6 years; 1 child, 6 years and 7 months. A sixteenth child gave a clear clinical history of hookworm disease of long standing, but during her twelve years residence in the city she had lost her infection.

The conclusion would therefore seem justified that persons bringing with them any infection of hookworm disease, from the country to the mills, may still retain part of their original infection for a period longer than 6 years and 7 months, but probably less than 12 years. On this basis it might be possible to account for at least 53 of the 59 cases, or 94.1 per cent, tabulated above, on the assumption that no new infection occurred after they had reached the mills. As will be shown in another article, however, infection can and undoubtedly does take place in some cases in the mill villages.

(5.) Again, if that peculiar anemia of the cotton mills in certain districts is due to breathing in the lint, it is not altogether reasonable to expect to find it in any great percentage or in any severe form among employes in knitting mills (where there is practically no lint as compared with the cotton mill), unless they have formerly worked in cotton mills, or among employes of a paper mill, where there is certainly no lint, or among medical students and trained nurses who have never worked in mills, or in orphan asylums among orphans who have never been inside of a cotton mill. The facts, however, are these:

The most anemia in any establishment found on the entire trip was a certain knitting mill; here, of 45 persons examined, 31 persons (68.8 per cent) had typical "cotton mill anemia," namely, hookworm disease. Some of these persons had worked in cotton mills, others had not.

In a factory where the paper cones are made for the cotton mills, typical "cotton mill anemia" was found among children some of whom, I am informed, had never worked in cotton mills.

Among the students of 4 medical colleges, 1 technical school, 1 agricultural school, 1 college and 4 training schools for nurses, typical cases of "cotton mill anemia" were found, but (if my information is correct) very few of these persons had ever worked in cotton mills. In one orphanage, 16 cases of the same type of anemia were found, but only one of the children had worked in the mills; in another orphanage, 18 cases were found among children who had never worked in the mills.

Conclusion.—The truth of the matter is, *this widespread and severe Southern "cotton mill anemia" has nothing to do with working in the cotton mills, but is directly traceable to other factors; namely, it is hookworm disease, contracted in the majority of cases on the*

farms; it is due largely to the present insanitary conditions existing in the rural districts, and is brought to the mills by the people who come from the farms. Further, while some of the infection does actually spread in the mill villages, the amount of such village infection is far below the amount of infection obtained on the farm before the people came to the mills; further, also, the sanitary conditions in nearly all the mill settlements (poor though they be) are so vastly superior to the average conditions on the farms from which these people came, that *as a rule* the mill workers *as a class* (there are exceptions) do, and necessarily must, improve in health the longer they live in the mill villages.

The foregoing statement should not be construed in meaning that life in a cotton mill is superior to life on a properly kept farm, *but that the life under the improved sanitary conditions of the average Southern cotton mill is better* (from a public health point of view) *than life as a tenant on a soil polluted one-horse farm, such as those from which so many of these people come.*

In order to understand the conditions in the Southern cotton mills, it is necessary to keep constantly in mind the fundamental fact that the labor in these mills is recruited chiefly from the white people living on the soil polluted farms or working as tenants or hired hands on some of the soil polluted plantations.

SMALLPOX IN LONDON.

An outbreak of smallpox has occurred in the east end of London, and there are now twenty-five cases. The first patient was a Jewess, aged 12, who was admitted to the Mile-End Infirmary February 5, after a few days' illness, suffering from an eruption. She was treated in one of the general wards till February 22, when the fact that other patients in the ward became ill led to a correct diagnosis. She was sent to the Smallpox Hospital; soon after a patient from the same ward, a nurse, and a woman who scrubbed the ward were also sent to the Smallpox Hospital. Another nurse was soon found to be affected. The nurses attacked had not been revaccinated. Three sisters of the first patient were found later to be affected with the disease. In all, eighteen cases arose in the infirmary. The ward in which the outbreak began has been isolated and its inmates have been detained under inspection for a fortnight. Every endeavor is being made to trace all persons who have been brought in contact with the disease, and extensive arrangements have been made for vaccination in the district. Smallpox in London shows great fluctuation. From time to time the disease is imported and gives rise to more or less serious epidemics. From 1885 to 1901 there was a period of comparative freedom, the number of cases falling as low as twenty-nine in 1899. In 1901 an epidemic of 1,700 cases occurred, which was followed by 7,796 in 1902. Since that year the disease has almost disappeared. In 1907 there were only eight cases and in 1908 four cases. In 1909 there were fifteen. The large number of unvaccinated persons, the result of the pernicious antivaccination campaign, is a cause of anxiety. The epidemic of 1901-2 gave a great impetus to vaccination, but this has now largely exhausted itself. In the locality of the present outbreak it is estimated that 32 per cent if the children are unvaccinated.

THE COLOR REACTION.—When a doctor prescribes capsules containing methylene blue, "medicinal," he should warn the patient that it will cause the urine to resemble blue ink; and when giving phenolphthalein tell them that if the "actions" are a light pink they do not indicate any harm, as it is the medicine that causes the color.

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Next Meeting Hattiesburg, Miss., November 11-13, 1911.

The American Society of Tropical Medicine

The meeting of the American Society of Tropical Medicine in New Orleans on May 18-19 was the most successful in the history of that important organization. It demonstrated the widespread and national interest in tropical diseases and proves conclusively that this organization, devoted entirely to the study and discussion of the diseases that exist in tropical and subtropical countries, has a permanent place among the great societies that are doing so much for the progress of scientific medicine in America.

The Spanish-American war with the invasion of Cuba and the annexation of Porto Rico and the Philippines, gave American physicians the opportunity to study tropical diseases in their endemic forms and the victories achieved over these enemies to the health, prosperity and happiness of millions of good American citizens, far overshadow those won by our army and navy, great and glorious as they were. For the lasting benefit to mankind and the commercial supremacy of the United States no battles that have been won by force of arms compare in importance with the driving of yellow fever from Havana and the Canal Zone. This conquest of tropical diseases, particularly yellow fever and malaria, made possible the completion of the Panama Canal and changed the Canal Zone from a veritable death hole to one of the most healthful spots on the globe. A number of the physicians, including Col. Gorgas, a former President of the Society, who have had charge of the sanitary work in Panama, were present at the New Orleans meeting and added much to the success of the occasion.

Dr. Thayer, in his presidential address, suggested that the society become affiliated with the American Congress of Physicians and Surgeons, and also that a Section on Tropical Medicine be created in the American Medical Association. The importance of the work, and the character and scientific attainments of the men who are interested in this subject,

would seem to justify such a movement on the part of both the American Congress of Physicians and Surgeons and the American Medical Association.

Dr. Thayer emphasized the importance of the study of tropical diseases and expressed the hope that a chair of Tropical Medicine would be endowed for Tulane, a sentiment which we heartily endorse, because no city in America offers greater opportunities for the study of tropical diseases than New Orleans. We also think that the medical schools in all the Gulf and Atlantic cities should have similar chairs. The medical departments of the Universities of Texas, Alabama and South Carolina, important ports, having direct communication with the tropical countries, are fortunately situated in that they provide a large amount of clinical material for the study of tropical diseases. The Medical Department of the University of Alabama has for a number of years provided special instruction in tropical medicine, Dr. R. Von Ezdorf, of the United States Public Health and Marine Hospital Service, being now in charge of that department.

Dr. Thayer also discussed our neglect in the prophylaxis of malaria, suggesting that a committee be appointed from the American Society of Tropical Medicine to make a complete report on that subject. The elimination of malaria from the United States is the most important of tropical medicine problems and we believe that the American Society of Tropical Medicine has an opportunity to do great good by actively taking up this question. Apropos to this, is the paper, "The Prevention of Malaria," in this number of the Journal, by Dr. Craig, who urges the establishment of a commission for the study and prevention of malaria according to the plan suggested by the writer[1] in a paper before the American Medical Association two years ago. Malaria is certainly as important a disease as uncinariasis and it would seem that philanthropists and the United States government should aid in its prevention.

[1]Sea'e Harris, M.D., "Prevention of Malaria," Journal of the American Medical Association, October 9, 1909.

Since that "prince of good fellows," Dr. Birney Guthrie, was chairman of the Committee of Arrangements, and the meeting having been held in New Orleans, it is needless to say that the entertainments for the society were most enjoyable. The program was excellent, many very valuable and scientific papers having been read. The Journal publishes several of these in this number and others will appear in later issues.

The next meeting of the American Society of Tropical Medicine will be held one day previous to, and in the same city with, the meeting of the American Medical Association for 1912.

Dr. Joseph H. White

The election of Dr. Joseph H. White as President of the American Society of Tropical Medicine is a deserved compliment to a modest man of exceptional attainments, whose life work has been spent in the study of tropical diseases.

There has been no more brilliant achievement in the history of preventive medicine than the extermination of yellow fever in New Orleans during the midsummer of 1905, at a time when the disease had a firm hold and many new cases were daily reported from all parts of the city. Dr. White, who had charge of this work, demonstrated to the American public the value of the discovery of the transmission of yellow fever by mosquitos. By thus proving that the South need have no fear of another widespread epidemic of the dreaded "yellow jack," Dr. White rendered a service to this section that means much for its industrial and commercial development.

Dr. White has received many honors at the hands of his confreres, having been chairman of the Section on Preventive Medicine and Public Health of the American Medical Association, etc.

He has had charge of the Marine Hospital in New Orleans since 1905 and that city is

most fortunate in having such a man as guardian for its port, to prevent the introduction and spread of tropical diseases.

Hormone Therapy

A German physician named Starling has invented the word "hormone" as a general term covering the elements derived from various tissues, glands or organs of the animal body and which possess definite power to influence physiological action.

Chief among these at present, so far as their employment for therapeutic purposes is concerned, are the substances derived from the suprarenal bodies, and from the thyroid gland. The action of each of these substances, used individually, is too well known to require description here. The remarkable effects of excess or absence of either constitute some of the most striking phenomena of modern pathology. The combination of two powerful hormones seems to offer new therapeutic values. It is now claimed that the hormones of the adrenals and of the pancreas exert a modifying influence upon each other when used together, or rather the pancreatic element tends to neutralize the other.

As the adrenal hormone can cause the appearance of glucose in the urine when not antagonized, and as that effect does not appear when the pancreatic hormone is added, the natural suggestion was to administer the latter in cases of diabetes mellitus. Experiments in this direction were followed by the elimination or material reduction of grave acidosis, but "disquieting effects were observed following these injections" and it seems the therapy of the pancreatic hormone is still in the experimental stage.

The hormones of other organs and tissues are known to possess active powers. Thus the serum from a mammary gland that is secreting milk, when repeatedly injected into the circulation of another female animal whose mammae have once secreted for its young, will arouse the secretion though neither pregnancy nor offspring are present. Basch claims to have located in the fecundated ovary the source of the hormone which stimulates the mammae to secretion.

A comparatively recent and extremely interesting development of this so-called chemical reflex action is the use of a hormone which has the specific action of stimulating the peristaltic function.

It is supposed to be generated by the gastric mucous membrane during the most active period of digestion, and to be started in the spleen, where it is more abundant than elsewhere. It is administered by intravenous injection and is promptly followed by energetic intestinal peristalsis from the pyloris downward. Like salvarsan, this seems to be a one dose treatment, a single injection establishing the peristaltic habit in about 70 per cent of the cases thus far tried. It has been used for a few cases of post-operative intestinal paresis, successfully, and seems to offer a much needed relief in such cases. The injections are sometimes followed by a rise of temperature of one or two degrees F. and rarely by brief nausea.

They are said to be painful. Peristaltic hormone cannot be classed as a purgative. It seems to be a reinforcement of a normal stimulus to peristalsis which may be deficient or absent. Along the line suggested by these investigations lie many of the most brilliant triumphs of the science of medicine in the near future.

Danger of Ethyl Chloride Anesthesia

The fortunate experience of certain physicians has led them to conclude that ethyl chloride is as safe an agent for producing brief anesthesia as is chloroform, and some think it safer.

The relative danger or safety of any anesthetic can only be finally determined by a study of results in thousands of cases, and comparing them with results in a like number of anesthesias from other agents. It is only recently that enough records of ethyl chloride anesthesias for such a comparison could be assembled, and the results of com-

parisons with ether and nitrous oxide anesthesias are disastrous to ethyl chloride, so far as mortality is concerned, the deaths being 1 to 5,710 cases, as quoted from statistics of McCardie and Miller by Wood in the A. M. A. Journal of December 24, 1910.

The mortality from ether is stated at 1 to 15,000, while that from nitrous oxide is estimated at one to a million anesthesias. Thus ethyl chloride is about two hundred times more dangerous than nitrous oxide. Moreover most of these deaths occur with appalling suddenness, ranging from half a minute to five minutes from the first inhalation. Many of the accidents have happened during dental operations. Ethyl chloride is so much more portable than nitrous oxide that it is a great temptation. It is, however, a convenient and powerful anesthetic, and there are many conditions where it would be the only one available, and where one would be justified in facing a risk of one in five thousand.

A Penalty For Efficiency

A blacksmith or a carpenter who is more skillful and efficient than others asks and receives a greater wage than is paid to his inferiors. A salesman who sells more goods than other salesmen is rewarded with an increased salary.

But the general practitioner whose knowledge and skill are so great that he cures his patients in half the time required by his less gifted competitor gets only half as much remuneration as they receive. Often two visits suffice for him to overcome a condition that threatens to become serious, and he is paid for two visits only. Meanwhile friends and relatives see no cause for gratitude, for where the relief was so prompt they conclude there was "not much the matter."

But let a well dressed incompetent take charge of such a case and how different the tale. Day after day the visits, the discouraging head-shakes and the dosing continue until perhaps, after many days, the patient is well again, though awfully weak and thin. But the doctor, who "was so faithful and attentive," is hailed as a saviour, and his bill, paid in installments as it may be, is looked on as a sacred, material acknowledgment of the kindness of Providence in providing such a good doctor in the emergency.

It would be more equitable if doctors worked "by the job" instead of by the visit.

Morphine in Pulmonary Edema

Stengle's article in the January number of the American Journal of the Medical Sciences, wherein he lauds morphine hypodermically as a remedy for pulmonary edema, places a valuable item of information before those members of the profession who have never seen its almost magical effect. The experience of the present writer has repeatedly shown its value. The first time he ventured to use it was in a case under his charge at a summer resort. There was valvular disease of the heart and attacks of dyspnoea in which the edema played a prominent part.

The suffering was so great that the patient begged for relief even if it ended the struggle. Finally the mother begged that he be relieved at any risk.

With many misgivings the writer injected a quarter of a grain of morphine into the biceps and then waited for results. They soon came. In one hour the young man was so relieved that he could walk about the room and not be troubled for breath. The next morning, protected by another dose, he went to his home, fifty miles distant by rail and nine by carriage, arrived in comfort and survived for several weeks, his sufferings soothed by the needle.

Since that time many cases in the writer's practice of cardiac dyspnoea and pulmonary edema, some paroxysmal, others merely fluctuating, have been benefited in greater or lesser degrees by the same expedient. Of course, not every case yields to morphine, but to those that do medicine can yield no richer boon. The question of habit can generally be ig-

nored in such cases, for their days are too few.

In more recent years the writer has generally combined small doses of atropine with the morphine, but is not certain that much benefit accrues from such. It takes large doses of atropine, not less than a hundredth of a grain, to dry up pulmonary effusions.

Erroneous Stenographic Reports

We regret to learn that there were some errors in the report made by the stenographer for the Section on Ophthalmology at the Nashville meeting of the *Southern Medical* Association. In discussing the valuable paper of Dr. H. H. Martin the reporter made Dr. Savage to say, in the second line of the discussion: "By recent trachoma I mean those cases *that would* justify," etc., etc., when Dr. Savage really said "those cases that would not justify scrubbing with sandpaper or with tooth brush, or any other surgical procedure."

Formula 4 should read "lanoline and vaselin each two drachms," instead of each 4 grains. Errors in some other discussions also occurred. They appean in the May number of the Journal.

The Journal employed as stenographers at the April meeting only those whose reputations were of the best, one of them being the well known Mr. Whitford.

The sum paid for their services exceeded the entire amount received by the Journal from the Association up to that date, as the books of ex-Secretary Dowling will show. Yet in spite of repeated urging the transcript was received barely in time to go to the printers, and could not be submitted to the authors. Hereafter no discussion will be printed until the author has had an opportunity to correct it.

The occurrence illustrates the difficulty of avoiding all errors in a publication such as the Journal. Every manuscript is carefully edited. The galley proofs are read three times, once by the authors and twice by our proofreaders, and finally the paged proofs are again read and corrected. Yet in spite of all this labor and care mistakes will creep in at unexpected places. We are grateful to our supporters for their patience and kind consideration, and are as thankful for just criticism as for praise, and the latter often accompanies the former.

"To err is human, to forgive Divine."

BOOK REVIEWS.

AMOEBIC OR TROPICAL DYSENTERY—ITS COMPLICATIONS AND TREATMENT. By W. Carnegie Brown, M.D. Member of the Royal College of Physicians. William Wood & Company, New York. $3.00 net.

This book treats of a subject whose growing importance to physicians in this country, especially in cities having much intercommunication with the coast, is not fully realized. The forms of dysentery with which we are chiefly familiar are either the mild, mucous diarrhoea of summer fruit-time or the more severe form caused by a bacillus similar to that named after the Japanese investigator, Shiga. These, if treated early, promptly yield to Epsom salts and aromatic sulphuric acid. But of late years more and more frequently we meet with dysentery at any time, winter or summer, which may seem to yield, but returns again and again, until finally we do that which we should have done at first; we spread a thin smear of feces on a slide and look at it through a 1-6 or 1-8 objective, and lo there we see amoeboid organisms large enough to contain dozens of blood corpuscles, surrounded, when in globular form, by a clear ring, the ectoplasm, and containing a granular mass in which generally is visible a nucleus with nucleolus and probably a few red corpuscles. These, we know, are the amoeba histolytica, and the case is one of amoebic dysentery. The temptation is strong to proceed with the fascinating life history of this troublesome bit of living jelly, but it is the business of the book, not of the reviewer, to tell that part of the story. And it tells it well, aided by a few illustrations, but not so many as an American author would use. John Bull is grown up and is not so fond of picture books as is his lanky son Samuel.

Nevertheless the author tells all that is known about amoebic dysentery, much of which is new to the reviewer. For instance, the polymorphonuclear poikilocytosis generally ascribed to the effect of the amoeboid toxins, he considers "the result of alcoholism or of intoxication by drugs." Also he states that the liver abscess acknowledged to be caused by this amoeba may sometimes appear before the dysentery symptoms have developed. Speaking

of prophylaxis, he considers boiling of the drinking water as the principal measure for insuring safety. He considers flies as real agents for collecting and distributing the infection.

The efficiency of sanitation is shown by the result on the American troops. Whereas the civilians in the Philippine Islands suffer with amoeboid dysentery to the extent of 15 to 20 per cent, the soldiers show only 3 per cent infected. As for treatment, he considers that during exacerbations a fever of 102°-104° F. seldom calls for treatment. Sponging is, however, permissible. Only in threatened collapse are alcoholic stimulants recommended. Here is one of the few formal prescriptions in the volume. He says that "hiccough, which is sometimes distressing," "may be arrested by an ounce of the following mixture, repeated every hour:

R. Liq. trinitrini (1 per cent)....eight drops
Spts. chloroform.....one drachm
Pure water sufficient to make four ounces.
Mix."

He considers ipecacuanha inadmissible during acute exacerbations, nor astringents during the same time. "The reputed intestinal germicides almost invariably do harm." Neither is the favorite mixture of quinine and chlorine of any use in relieving the pain or checking the discharges. In the acute stage pain should be relieved by hypodermics of morphine. Absolute rest must be observed and good nursing and nourishment provided. The bowel should be washed out with solutions of boracic acid. Opiates must not be injected into the rectum. Calomel 2½ grains and ¾ grain of powdered opium every 2 hours until effectual.

The author claims that this measure has often proved very useful. Large doses are not admissible. As a substitute for calomel one drachm of magnesium sulphate in an ounce of cinnamon water every hour may be used. The diet must be very light. The book is gotten up in linen covers and is an excellent example of book-maning.

MODERN TREATMENT, THE MANAGEMENT OF DISEASE WITH MEDICAL AND NON-MEDICAL REMEDIES. In contributions by American and foreign authorities. By Hobart Amory Hare, M.D., assisted by H. R. M. Landis, M.D. In two volumes. Published by Lea & Febiger, Philadelphia and New York.

This is truly an immense favor to the medical profession of this country thus to assemble the knowledge of the world's most capable physicians within practical limits for the general convenience.

Dr. Hare has always been recognized as one of the foremost and most able defenders of medicinal treatment of disease as opposed to the folly of so-called drug-nihilism. In these volumes while he presents the latest and most approved methods of non-medicinal treatment he also brings to his readers full accounts of the most recent additions to the pharmacopeia, as well as those of long standing. He strives especially to lay before his readers the potentialities of the serums and vaccines. He apparently could not refrain, in his preface to the first volume, from striking another sturdy blow at those who "for lack of knowledge not rarely endeavor to ridicule the procedures which are often resorted to by competent and experienced men." He justly blames them for their tendency "to ignore the fact that even if the explanation given as to the means by which a remedy does good is wrong, this in no way impairs the value of the statement that it does good."

The first 600 pages of Vol. 1 are occupied with a description of the elements of Materia Medica of every class and description, including the non-medicinal measures used in the treatment or prevention of disease. Then comes Part III, Treatment of the Infectious Diseases, beginning with Typhoid Fever. The article on Plague, written by Thomas Wright Jackson, is of great present interest in view of the prevalence of that terrible disease in India and China. Among other statements he gives an account of the unfortunate accidents which have given plague serum and plague vaccine such great unpopularity in the countries where the accidents occurred.

One was the death of the first 18 cases inoculated, with tetanus. The other was the death, at Manila, in November, 1906, of 14 persons who received by mistake pure culture injections instead of immunizing serum.

It is no wonder that plague serum is not popular in the Philippines. The second volume of this valuable work will receive attention in a succeeding number of the Journal.

MEDICAL CHAOS AND CRIME. By Norman Barnesby, M.D. Published by Mitchell, Kennersley, London and New York. Pages 384. Price, $2.00 net.

After so long listening to the stock phrases in honor of "our noble profession" perhaps it is well for us to gaze at our images in the opposite surface of the mirror and see how small a doctor can look when he forgets his professional obligations and perverts his great opportunities for usefulness to selfish purposes and dishonest practices.

Dr. Barnesby holds the mirror up faithfully and well. Among other things he tells stories of doctors making fatal errors in treatment and hiding behind the shield of ethical consultation; of an eminent surgeon removing a gravid uterus thinking it was a fibroid, while four other eminent surgeons, invited to "assist" knew better, but dared not remonstrate because of ethics; of absolutely uncalled for operations performed for the sake of a $2,000.00 fee; of a $25.00 charge extra for cocaine where only plain water was used, and so on ad nauseam. He defends vivisection when properly conducted, but condemns its use anywhere when done simply to display the beating heart and arteries to some class in physiology. He rails in righteous wrath against the "gynecological pervert" with a mania for mutilating women. He castigates many "hospital abuses," some of which, he alleges, being almost incredible. For instance, he describes the practice of jerking out toenails, performing circumcision, cutting down on foreign bodies, etc., all without cocaine or other anaesthetic, merely because there was no money in it; hospitals where the milk was skimmed so that the nurses and orderlies might enjoy the cream. Finally hospitals where the purchase of apparatus and supplies of all kinds was utilized for the introduction of barefaced graft, and so on until one almost despairs.

The object of the book is apparently to demonstrate the necessity for reform and the proper way to accomplish it. He wishes, he says, to secure "a unanimous demand for reform."

For medical graft he recommends publicity. The

public should be taught some standard of prices so that it could not happen, as it did to a Chicago doctor, to charge one woman $8.00 obstetrical fee, and another just like it, both normal deliveries, $1,000.00. He got only four hundred, because that was what they had previously paid another physician; and they called him a "grafter" when they sent his check.

The author considers the "stock-company medical schools" the "hotbeds" of commercialism as well as incompetence.

The code of ethics should, he says, be radically changed, so that no physician will be obliged to "prostitute his professional trust" to protect another. Better education before entering medical schools should be demanded, and five years of ten months each should be the standard of attendance. There should be more hospitals where students could have clinical advantages, and these hospitals should be modeled upon the Mayo institution at Rochester, Minnesota.

A court should be established to inquire into any unusual percentage of fatalities in the practice of any surgeon. Anaesthesia should be a speciality. The work concludes with a series of appendices, twelve in number, but lettered from A to L instead of numbered.

They consist chiefly of discussions by well-known masters in various lines of medicine and surgery. From cover to cover every page is of absorbing interest and seems adherent to truth. What more could be said in its favor?

HUGHES' PRACTICE OF MEDICINE. Including a section on Mental Diseases and one on Diseases of the Skin. P. Blakiston's Sons, Philadelphia.

Doctor, do you want a book on practice that you can turn to when you are in a hurry for fresh information about some condition or disease and find it promptly, in a concise, practical form?

Do you want a book on practice that condenses all the preliminary study concerning each disease into a few paragraphs, yet gives all needed information? Do you want a book on practice written by a man who believes in practicing medicine with medicines, who knows how to do it; and who knows how to tell you how to do it. If you do, buy Hughes' Practice of Medicine. It is not a very large book, but it is large enough, and it is most elegantly gotten up, with the best of paper, clear type easy to read, gilt edges and flexible cover of pebbled morocco. That is its chief fault—it is too handsome for everyday use, yet that is just what the every-day doctor of a practical turn of mind will do with it. There are some 67 illustrations, nothing especially fine, but each telling a plain story, such as Curschmann's spirals, first natural size, then magnified; the amoeba of dysentery; trypanosomes looking like baby trout just hatched; fever charts and so on.

It is a thorough-going, practical book, but very condensed in the matter of preliminary considerations of history, etiology, etc.

It is a book for the active practitioner rather than the student, and no hard-worked doctor will regret buying it.

MAKERS OF MAN—A STUDY OF HUMAN INITIATIVE. By Charles J. Whitby, M.D. (Cantab.) With forty-seven half-tone and other plates. New York, Rebman Company.

This is a remarkable record of a remarkable analysis of the forming influence of remarkable personages upon human history. It is not a book to please those who are averse to hard thinking.

From the introductory chapter, wherein the writer essays to connect some kind of psychological character with the "homogeneous anucleated monocellular protist" supposed by Haeckel to be the first demonstrable rung of the ladder leading to man's existence, to the last page of the last chapter, wherein he concludes that in spite "of our anarchist friends" the earth "needs government still; and is likely to need it for some time to come," he lays before his readers a succession of panoramas of absorbing interest, each dealing with the life, character and *personality* of some famous person. Their realms of power are those of the soldier, the sage, the artist and the poet, each illustrated by a picture which is supposed to be as nearly a likeness as present facilities can afford.

Of these Caesar comes first, Renan last, and he couples Emmerson with the latter as one of the modern exemplars of the supreme type of the ethico-religious character. He speaks of Christ only from the human, and not the divine side of His character, putting aside as beyond the possibility of proof the extreme view of those who declare such a personage never existed. He philosophizes concerning the development of Christ's character in a manner new to most students of religious history.

The portrait he presents is from the painting "By Luini, in the National Gallery." It presents the picture of a head which might be the likeness of either a masculine woman or of a man with feminine traits.

Analysis shows that every feature is strongly, though placidly, masculine, excepting the eyes, but those eyes are large, languishing and sad, not at all those of a man. The hair lends force to the femininity of the portrait, being very long, parted in the middle and flowing in curls down upon the large but sloping shoulders.

It is impossible to give anything like an adequate idea of such a book within the limits of a review. One longs to consider what the author has to say about men like Napoleon, Lincoln or Cromwell as men of action, Turner as an artist, Byron and Scott as poets and Newton and Darwin as scientific men and philosophers. The whole gamut of the life history of humanity is sounded, and the great ones of the race are the keys he touches, but one cannot convey an impression of music by naming the notes in which it is written. Only this much can be said to cover the worth of the work, namely: No living man exists, be he uncultured or be he scholarly, whose education will not be widened by reading it.

CORRESPONDENCE

Editors Southern Medical Journal:

Will you please publish in the next issue of your Journal answers to the following questions:

What is the concensus of opinion concerning the infectiousness of pellagra? Would you disinfect a room in which a pellagrin has lived for the last six or eight months?

If so, what would be the best disinfectant to use and how used?

What is the best method of using formalin and what is a convenient method where you have no apparatus?

I prefer that my name should not be published. Yours very truly,

_____.

Replying to the foregoing questions in the order in which they appear, we would say: The concensus of opinion among physicians is that pellagra is not infectious in the ordinary sense of the term. A person could not contract the disease by contact with a pellagrin nor by sleeping in the same room with such a patient. Certain physicians believe that the contagion is communicated by the bite of an infected gnat resembling a buffalo gnat and technically known as *simulium reptens*. We are not prepared to state whether or not the insect requires a period of incubation before it is able to communicate the disease. For the destruction of the gnat the fumes of burning insect powder will probably be all sufficient.

The notable instance of apparent communication of the disease occurring at an orphan asylum in Nashville, Tenn., would have been an exceedingly valuable object lesson had the gnat theory been known at that time and the presence or absence of that species of the insect been noted.

Replying to your question as to disinfecting the rooms of pellagrins, we would be in favor of doing so, for any room occupied for six months by the victim of any chronic disease should be disinfected before being occupied by other parties.

In order to disinfect a room after pellagra we would prefer the fumes of burning sulphur because it would insure the death of any parasite, whether of animal or vegetable nature. The easiest way to disinfect with sulphur is as follows, where there is no apparatus and economy is desirable. First, close every opening and chink every crack. Second, grease a rag with vaseline and with it smear over all nickel, silver, brass or gilded surfaces in the room. Third, place a large iron kettle in the center of the room. Place in this a smaller iron kettle and pour two quarts of water between them. Now put into the smaller kettle a double handful of charcoal, pour upon this five pounds of coarsely broken brimstone, and pour over both half a pint of wood alcohol. Light a small wad of paper and throw it onto the sulphur and leave the room, closing the door tightly. The paper will ignite the alcohol, and that the charcoal and the whole mass will be in flame. The water between the kettles is a safeguard against fire and will provide the moisture in the atmosphere necessary for the efficiency of the gas.

The most convenient method of using formalin is to dilute it with six parts of water to one of formalin, wet sheets and cloths with the mixture and hang them up in the room. The walls and floors may also be sprinkled. Bedding and clothing should be so arranged as to be easily reached by the gas.

The same precaution to prevent the escape of the gas should be observed as with sulphur, but the vaseline may be omitted.

We also suggest that our friend will find considerable information concerning pellagra in this number of the Journal, as well as in those of past months.

YANGCHOW, CHINA, April 25, 1911.

Dr. H. A. Moody, Mobile Ala.

MY DEAR DR. MOODY: Your letter of December 27 was duly received. I at once went to work to get the information that you de-

sired about the native method of dispensing, but I have let the cares of a busy life keep me from putting it down in black and white. I hope what I send you can be used in the Journal. I appreciate very much the invitation to join your staff of contributors, and if I find anything of interest I will be glad to send it to you. We daily have curious and distressing instances of malpractice on the part of the native "Mal-practitioners," and if you think such things would be of interest to your readers, I will be glad to report them to you from time to time.

Wishing you every success in your effort to elevate the professional standards at home, I am Sincerely yours,

ADRIAN S. TAYLOR.

NOTICE!

The following announcement is published for the information of the large number of our readers who are interested in Tropical Medicine:

Far Eastern Association of Tropical Medicine, Second Biennial Congress, Hongkong, January 20 to January 27, 1912.

President: J. Mitford Atkinson, M.B., D.P.H., Hongkong. Vice Presidents: W. G. Ellis, M.D., Straits Settlements; J. de Haan, M.D., Java; Victor G. Heiser, M.D., Philippine Islands; H. Campbell Highet, M.D., D.P.H., Siam; Neil Macleod, M.D., Shanghai; Sir Allen Perry, M.D., D.P.H., Ceylon; Professor G. Shibiyama, M.D., Japan; J. Staby, M.D., Tsingtau; Professor Yersin, M.D., French Indo-China.

DEAR SIR: The Second Biennial Congress of this Association will be held in Hongkong from Saturday, January 20, to Saturday, January 27, 1912, and you are cordially invited to attend and to take part in the work of the congress. The association is an international one formed to promote the science and art of Tropical Medicine in the Far East.

The fortnightly French mail steamer from Ceylon, Singapore and Saigon, is due to arrive in Hongkong on Tuesday or Wednesday, January 16 or 17, and the fortnightly English (P. & O.) mail steamer from Ceylon, Penang and Singapore, is due to arrive on Friday, January 19, while there are several mail steamers arriving in Hongkong each week from the North.

Saturday, January 20, will be devoted to the reception of official delegates and visitors, leaving the whole of the following week for the scientific work of the congress.

A Scientific Committee has been appointed, consisting of: Col. W. G. Bedford, C.M.G., M.B., P.M.O., chairman; Deputy Inspector General J. L. Barrington, R.N.; Charles Forsyth, M.D., F.R.C.S. (Edin); Oskar Muller, M.D. (Munich); F. Osmund Stedman, M.D. (London), to classify the papers which are offered, so as to give, as far as possible, a day to each of the following groups of subjects:

Protozoology—Helminthology.

Cholera—Plague—Leprosy—Tuberculosis.

Tropical Fevers, including Malaria—Beri-Beri—Dysentery.

Surgery—Obstetrics—Infantile Diseases.

Climate—Hygiene—Sanitation.

It is requested that a brief abstract of each paper be forwarded to me as soon as convenient, for the information and guidance of this committee. Papers may be read in either English, French or German, but authors are asked to send their abstracts in English in all cases.

The subscription to the association is 10|6 ($6 Hongkong currency) and is due now (1911), but no further subscription will be required until 1913.

A suitable social programme will be arranged for the entertainment of visitors during the congress.

You are requested to detach the accompanying slip and forward it to me duly filled up at your earliest convenience for the information of the local committee. I am, sir,

Yours very faithfully,

FRANCIS CLARK, M.D., M.R.C.P., D.PH.,
Secretary-Treasurer-General.

Hongkong, March 7, 1911.

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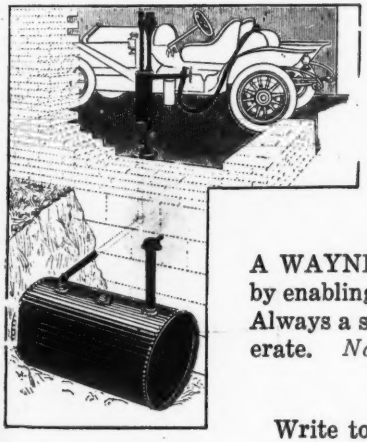

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DR. PINET, in "*Le Concours Medical*," May 14, '04.

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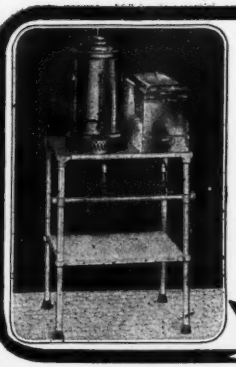

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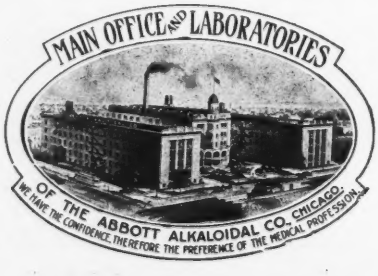
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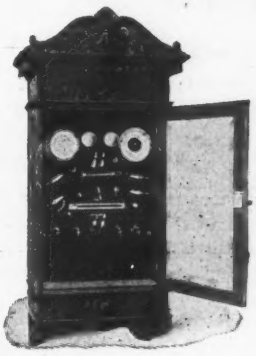

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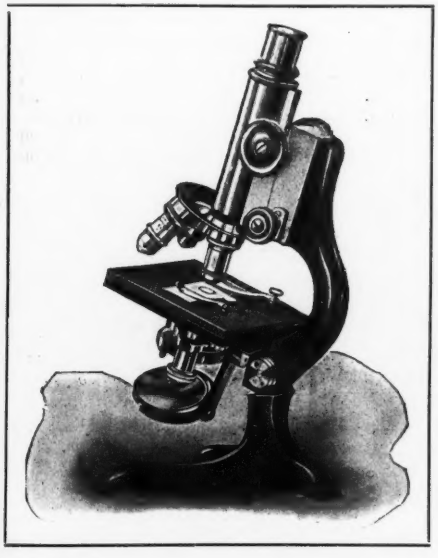

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TO ADVERTISERS:

¶ The recent census of the United States shows that six Southern States prove a net gain of population amounting to 2,260,215 during the past ten years. The figures would be much larger but for the fact Georgia and Florida are omitted because their census reports are not complete at the time of writing this article. Thə average gain in population by the six States in the ten years is about 16 per cent.

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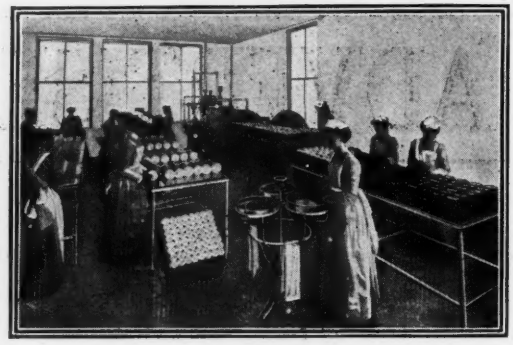

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We have spent two decades in perfecting these products. The highest skill that we know is employed on them.

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Samples gladly sent on request.

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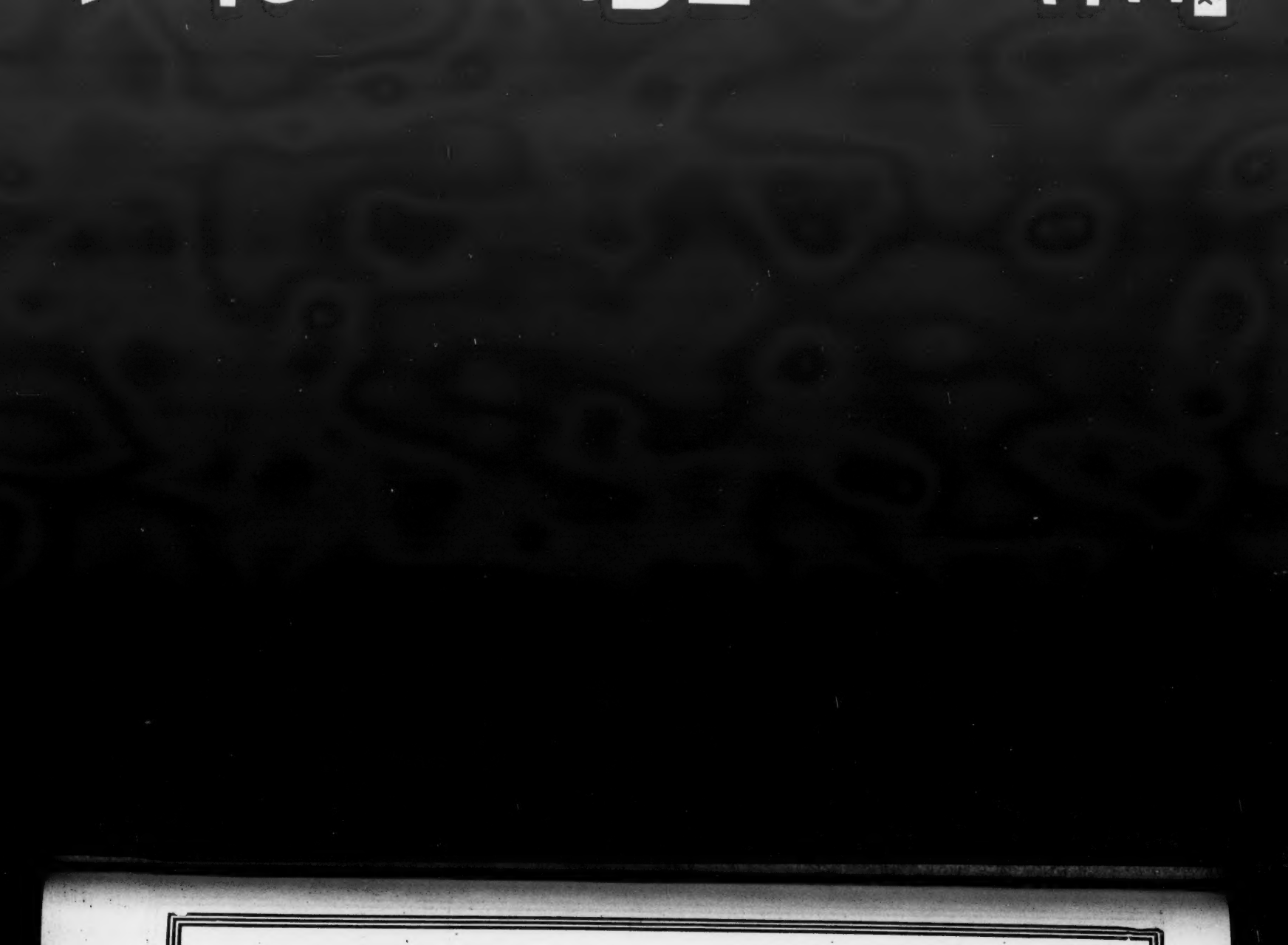

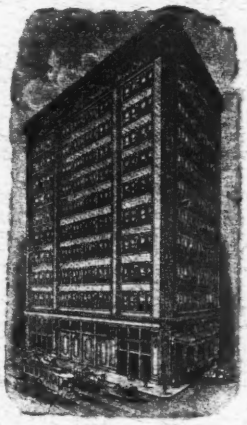

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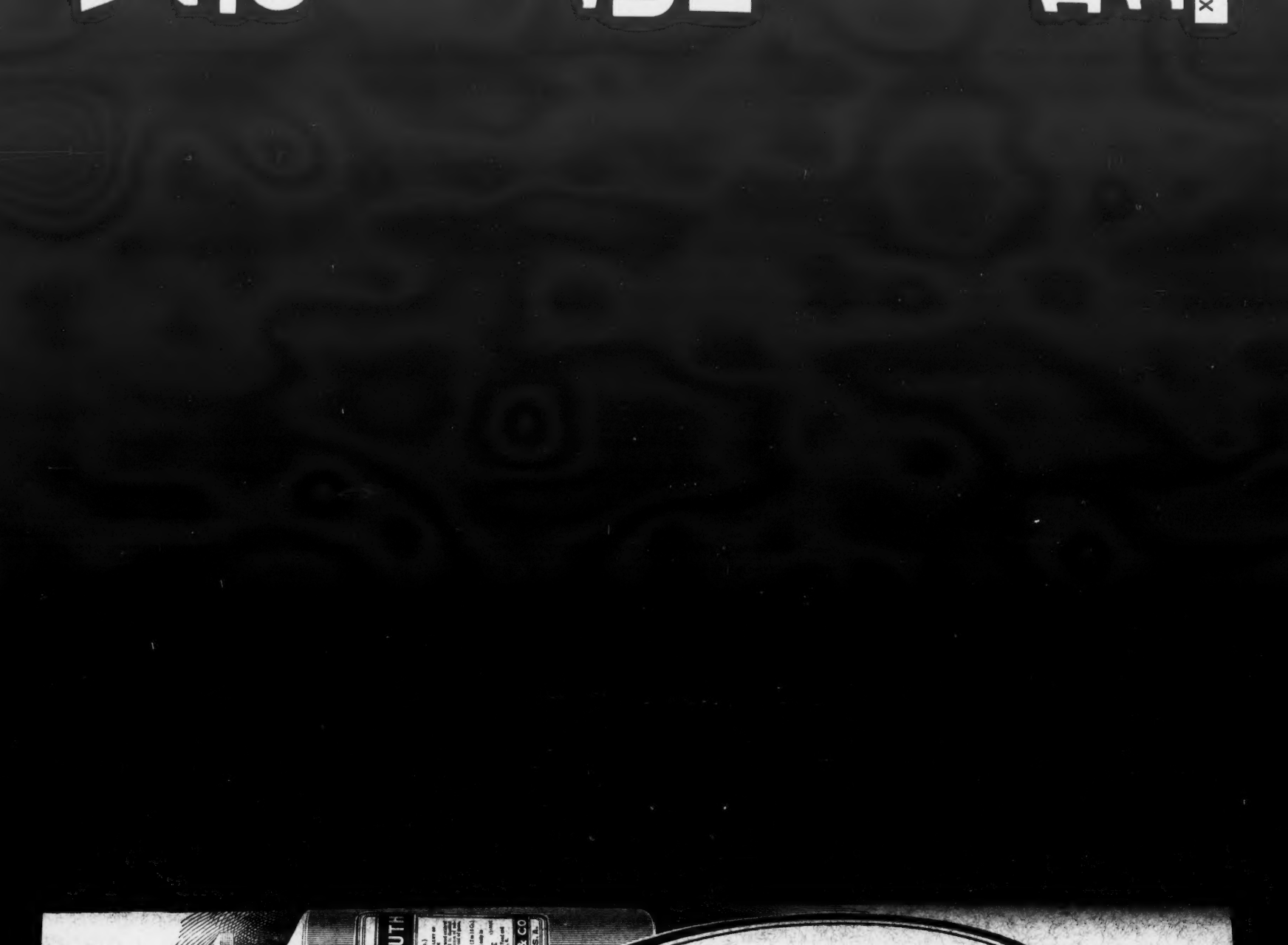
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